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**Farm  
Incomes**



**"CORN  
STATES"**

The cash income of American farmers was more than nine billion dollars in 1940. The exact figure of one report is \$9,094,000,000.

Excluding benefit payments, livestock brought nearly five billion dollars. The figure for this item is \$4,824,000,000. Crops brought but \$3,504,000,000.

The income from meat animals, excluding poultry, was \$2,148,000,000 and from dairy products, \$1,502,000,000; and experts predict that the total will be higher by \$600,000,000 for 1941.

There would be no motive for expounding these statistics were it not for the fact that a percentage of these earnings comes from "Corn States" territory and that they show the great burden resting upon the well-governed veterinary service in which "Corn States" labors.

***To Aid in Protecting This Income  
Is the Function of  
The  
CORN STATES SERUM COMPANY  
Omaha***

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## Progress Made in the Study of Brucellosis During the Past 25 Years\*

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*East Lansing, Mich.*

THE BRUCELLOSIS problem 25 years ago was just emerging from the odor of carbolic acid and the color of methylene blue. The isolation of the organism at that time required a combination of imagination, burning candles and hay bacillus.

Serologic tests for the detection of the disease were considered more a plaything than an indispensable tool for its control. There were, however, during this period a few voices raised in approval of their diagnostic value, but they were at the time, and for a number of years afterwards, neutralized by louder voices that said such tests were of little practical value. The differences in opinions in regard to the interpretation and value of the serologic tests were due principally to the confusion which existed at the time regarding the knowledge of the nature of the disease in cattle. Those who were concerned with the melitensis form of brucellosis had already accepted the agglutination test as an aid to its diagnosis in both animals and man. This test came near to being the means of revealing the connecting link between *Brucella abortus* and *melitensis* ten years before the brilliant discovery of Evans.

Twenty-five years ago the opinion prevailed that the bull was the chief factor in the spread of the disease, and the advocates of "neutral ground" for breeding animals were to be found in all sections of the country. The bull factor prevailed for some time despite the fact that Moore and Fitch,<sup>1</sup> as early as 1913, proved that cattle could easily be infected by the oral route. Many remained unimpressed with the importance of the oral route of infection until the publication of conclusive data on this subject by Birch and Gilman<sup>2</sup> in 1925.

Those who have followed the unfolding of the story of brucellosis are aware that important chapters have been contributed by small groups of workers in many laboratories in both the eastern and western hemispheres. The American system of conducting investigations in animal diseases by small groups of workers in widely separated laboratories may not be the most efficient and speedy way of conducting research, but when one considers the magnitude of the brucellosis problem and the comparatively small amount of money spent in its study during the past quarter of a

<sup>1</sup>Moore, V. A., and Fitch, C. P.: A study of infectious abortion in cattle. Rpt. New York State Vet. Coll. (1913), pp. 82-110.

<sup>2</sup>Birch, R. R., and Gilman, H. L.: The channels of invasion of *Bacterium abortum* with special reference to ingestion. Cornell Vet., xv (1925), p. 90.

\*From the Department of Bacteriology, Michigan State College; journal article No. 478, new series, of the Michigan Agricultural Experiment Station. Presented before the first general session of the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

century, one must admit that this system of conducting research has produced results unequaled in any other disease.

#### BOVINE BRUCELLOSIS RESEARCH REVIEWED

Let us review briefly some of the important chapters of progress that have been written on brucellosis during the past 25 years. It is important that this be done, because many who have entered this field of study in recent years and a few who have long been intimately associated with the problem have neglected to review the past to find out how much has been accomplished and, consequently, have missed important contributions that have already been made on many phases of the disease. The newcomer, by his failure to become thoroughly acquainted with the past, often finds himself spending much time and energy in the study of a problem that needs no further elucidation.

One important question, the answer to which was sought and found in the early part of this 25-year period, was the susceptibility of newborn calves to infection, that is, healthy calves born to infected dams and calves exposed to infection by feeding infective milk. The results of these experiments, which proved that young calves could not be permanently infected, paved the road for calf vaccination. This idea of calf vaccination was conceived by Cotton, Buck and Smith<sup>3</sup> in 1933, but is only now receiving due recognition.

It is generally recognized that one of the first prerequisites for the study of any disease is the development of a satisfactory method for the rapid isolation and cultivation of the causative organism. Until 1920, guinea pig inoculation was the chief method used for detecting the presence of the organism in animal tissues and milk. Since a period of four to six weeks of incubation was required, this served to slow up investigations and made large-scale bacteriologic surveys impossible.

The employment of the increased CO<sub>2</sub>

<sup>3</sup>Cotton, W. E., Buck, J. M., and Smith, H. E.: Efficacy of an avirulent strain of *Br. abortus* for vaccinating cattle. *J. Agr. Res.*, xlv (1933), p. 291.

tension method, and of suitable media, such as liver, potato and tryptose agar, for the isolation and cultivation of *Br. abortus* furnished means for more accurate and wider investigations and played an important rôle in the progress that has been made in understanding the nature of the disease, and the behavior of the different species of *Brucella*.

If one is to become the master of a disease, he must know its power of infectivity by natural and artificial means and its viability under different conditions. The success of any control measure, be it by immunization or by the application of sanitary practices, depends upon the extent of our knowledge of the two factors just mentioned.

It is unfortunate that so little attention should have been given to the importance of determining the size of the infecting dose of organisms in experiments on animals in which the objects in view were to compare virulence of strains and to determine infectivity by different routes of exposure. The Mediterranean Fever Commission as early as 1907 showed that the infective power of *Br. melitensis* is high. But in the case of *Br. abortus* there has always been a difference of opinion as to its invasive ability. This doubt existed in the face of the experimental data obtained by Hagan,<sup>4, 5</sup> who showed that fewer than 100 *Br. abortus* organisms were required to infect the guinea pig and only nine the rat experimentally. The question of its invasiveness for cattle was not answered until 1939 by McEwen in England.

McEwen and associates,<sup>6</sup> in an experiment designed to determine the minimum infective dose of *Br. abortus* for cattle, exposed five groups of ten heifers after breeding to different sized doses of bacteria by way of the conjunctiva. Group 1 received 1,460,000,000 bacteria; group 2, 14,600,000; group 3, 1,460,000; group 4, 146,000; and group 5, 1,460. In groups 1 and 2, nine animals became infected; in groups 3, 4 and 5,

<sup>4</sup>Hagan, W. A.: The susceptibility of mice and rats to infection with *Br. abortus*. *J. Exp. Med.*, xxxvi (1922), p. 727.

<sup>5</sup>*Ibid.*: Studies on the disease in guinea pigs due to *B. abortus*. *J. Exp. Med.*, xxxvi (1922), pp. 697-709.



seven, five and two animals, respectively, became infected. The results show that the minimum infecting dose of a given strain for the average susceptible cow is in the neighborhood of 1,000,000 bacteria.

The results obtained by McEwen and associates<sup>6</sup> are summarized in table I. It is of interest to note that the time of the first appearance of a significant agglutination titer after exposure to infection is directly proportional to the size of the dose of bacteria. Exposure to a large dose of bacteria elicits a significant titer in 14 to 28 days. When the exposing dose is less than 1,000,000 bacteria, significant titers do not appear until 80 to 106 days.

During the past six years the writer and his associates have noted a reduction in virulence of many newly isolated strains of *Br. abortus* in comparison with those isolated 20 years ago. This is particularly true of those isolated from animals in herds where the infection has been present for more than ten years. It has been our observation that the virulence of a given strain of *Brucella* is associated with the

presence of a capsule on the bacteria. The size and persistence of the capsule appear to be essential for invasive ability. Strains which do not possess a capsule, such as the rough forms, are lacking in pathogenicity.

Another factor that has been given too little attention in considering the infecting ability of a given strain of *Br. abortus* for cattle is the state of pregnancy of the animals. Over a period of years, the writer and his associates have collected a large amount of data pertaining to the incidence of abortion in nonpregnant animals that become infected naturally. These data show that such animals seldom, if ever, abort the fetus in subsequent pregnancies.

There has appeared during the past year a noteworthy contribution on the susceptibility of pregnant and nonpregnant cattle to *Brucella* infection after artificial exposure by various routes. Edgington and Donham<sup>7</sup> exposed twelve pregnant and 15 nonpregnant heifers to large doses of the organism. Eight of the heifers exposed before breeding were again exposed during different stages of gestation. Of those ex-

<sup>6</sup>McEwen, A. D., Priestly, F. W., and Patterson, J. D.: An estimate of a suitable infective dose of *Br. abortus* for immunization test on cattle. *J. Comp. Path. & Ther.*, lli (1939), pp. 116-127.

<sup>7</sup>Edgington, B. H., and Donham, C. R.: Infection and reinfection experiments with Bang's disease. *J. Agr. Res.*, lxx (1939), pp. 609-618.

TABLE I—The Infective Dose of *Br. Abortus* for Pregnant Heifers

| GROUP             | NO. OF ORGANISMS INOCULATED | NO. OF ANIMALS SHOWING SEROLOGIC EVIDENCE OF INFECTION AFTER EXPOSURE* |          |   |   |   | NO. SHOWING BACTERIOLOGIC INFECTION |
|-------------------|-----------------------------|--|----------|---|---|---|-------------------------------------|
|                   |                             | 14th day   | 28th day |   |   |   |                                     |
| I<br>10 animals   | 1,460 x 10 <sup>6</sup>     | 7  | 3        |   |   |   | 9                                   |
| II<br>10 animals  | 1,460 x 10 <sup>4</sup>     | 3  | 4        | 2 |   |   | 9                                   |
| III<br>10 animals | 1,460 x 10 <sup>3</sup>     | 1  | 3        | 1 | 1 |   | 7                                   |
| IV<br>10 animals  | 1,460 x 10 <sup>2</sup>     | 1  | 1        | 1 | 1 | 1 | 5                                   |
| V<br>10 animals   | 1,460                       | 1  |          |   |   |   | 6                                   |

\*Agglutination titer of 1:40 or higher.

After McEwen.<sup>6</sup>

posed during pregnancy, eleven became infected and aborted. The nonpregnant heifers not only failed to abort during pregnancy, but apparently failed to become infected. The investigators obtained similar results on six cows which were exposed before and after breeding. Their data are summarized in table II.

The data obtained by Edgington and Donham from their well-controlled experiment have filled a space in our knowledge of the natural course of the disease in cattle and answer many questions regarding susceptibility and resistance to infection.

There existed much confusion and guessing regarding the necessary hygienic and sanitary measures that should be taken to prevent the transmission of brucellosis until the channels through which the organism were eliminated from the infected host became known, and their viability under varying conditions outside the body was determined.

Although the Mediterranean Fever Commission had published considerable data on these two subjects pertaining to *Br. melitensis* as early as 1906, little was known about the habits of *Br. abortus* and *Br. suis* until recent years. Today there is as much knowledge available on the habits of all species of *Brucella* as any other pathogenic bacteria. If it were used properly and to the fullest extent by sanitarians in whose hands the control of the disease has been placed, they would encounter fewer difficulties in their labors.

The slaughter plan for removing infected animals with the expectation of eliminating brucellosis in cattle has been in operation in certain states for 15 years, and on an extensive scale under federal supervision in most of the states for the past six years. The plan was placed in operation with a great deal of enthusiasm and has received the support of the veterinary profession and breeders' organizations. The slaughter plan was instituted in the face of the fact that previous preliminary surveys had indicated the incidence of infection in cattle would average 15 per cent and with the knowledge that the cow is not the only host for *Brucella*. The failure of several enthusiastic advocates of the plan to give any consideration whatsoever to sources of infection other than the infected cow and the incubation period in the disease has accounted for its failure in many instances and caused much disappointment in those directly concerned.

An unbiased analysis of the records of the cooperative federal-state Bang's disease program shows that considerable progress has been made in reducing the percentage of infected cattle and, further, the disease has been eliminated in a large number of herds. The success of the slaughter plan in eliminating the disease from infected herds appears to be inversely proportional to the size of the herd. Difficulty has been encountered in eliminating the disease from herds of a considerable size and preventing reinfections in many smaller ones. The

TABLE II—The Susceptibility of Pregnant and Nonpregnant Heifers to *Br. Abortus* Infection

| GROUP | NO. OF ANIMALS | STATE OF PREGNANCY | ROUTE OF EXPOSURE | NO. ABORTING  | NO. BECOMING INFECTED |
|-------|----------------|--------------------|-------------------|---------------|-----------------------|
| I     | 12             | +                  | Vagina            | 11            | 11                    |
| II    | 4              | —                  | Vagina            | None          | None                  |
| III*  | 3              | —                  | Eye Vagina        | None          | None                  |
| IV    | 4              | —                  | Eye Vagina        | None pregnant | None                  |
| V*    | 4              | —                  | Vagina or oral    | None          | None                  |
| VI*   | 6              | —                  | Vagina or eye     | None          | None                  |

\*Re-exposed during pregnancy.

After Edgington and Donham.<sup>7</sup>

failures in most instances can not be attributed to laxity in sanitary practices or inadequate supervision. It is possible that when more information is available concerning the incubation period of the disease in the cow and more consideration is given to other hosts of *Brucella*, less difficulty will be met in the elimination of brucellosis from large herds.

The employment of a simple and accurate diagnostic test has been largely responsible for the progress that has been made in the control of bovine brucellosis. There is still one factor in the employment of the agglutination test that too few have taken into consideration, that is, the state of the culture used in the preparation of the antigen. If the culture used in its preparation is not the smooth form, the results of the test are confusing and this causes many to lose faith in its accuracy.

When one reviews the history of attempts toward vaccinal immunization against bovine brucellosis, it is readily apparent that it has traveled a stormy and not well-charted course. This was due in part to the fact that vaccination was being done because of a blind faith in artificial immunization procedures, and in part to the failure to realize that too little was known about the nature and epizootology of the disease in the bovine. The idea behind vaccinal immunization at first was the prevention of abortion rather than of infection. In recent years it has been realized that prevention of infection is the goal to be attained.

The studies initiated by Cotton, Buck

and Smith<sup>3</sup> on calf vaccination with a live culture appear to offer hopeful possibilities. Certainly, the data thus far collected do not indicate that such a procedure of vaccinating calves causes any harmful effect. The summarized results presented in table III from studies conducted on the vaccine culture by many investigators show that considerable protection against brucellosis infection is obtained from its use in calves.

McEwen<sup>8</sup> in England also has been investigating the possibility of using a live culture of *Br. abortus* of low virulence for immunizing adult animals as well as those under breeding age. In 1937, there appeared the first comprehensive report of his studies in this direction in which a sufficient number of controls were left to give the results significance. The tabulated data from one of McEwen's experiments are presented in table IV.

The writer and his associates have devoted considerable time to the study of the immunologic properties of the chemical constituents in *Brucella* cells. The various antigenic fractions, until recently, have failed to immunize the guinea pig against experimental infection. A fraction has now been obtained from the cells, after crushing in a Booth and Green<sup>8a</sup> crushing mill, which will immunize the guinea pig against experimental infection with a highly viru-

<sup>8</sup>McEwen, A. D.: Experiments on contagious abortion. II. Field immunisation experiments with a vaccine prepared from strain 45. *Vet. Rec.*, xlix (1937), 51, pp. 1585-1596.

<sup>8a</sup>Booth, V. H., and Green, D. E.: A wet-crushing mill for micro-organisms. *Biochem. J.*, xxxii (1938), 5, pp. 855-861.

TABLE III—Summary of Results of Calfhod Vaccination with BAI Strain 19 as Reported by Several Investigators

| ORIGIN OF STUDY          | METHOD OF EXPOSURE | VACCINATED |                     | CONTROLS |                     |
|--------------------------|--------------------|------------|---------------------|----------|---------------------|
|                          |                    | TOTAL      | NO. BECAME INFECTED | TOTAL    | NO. BECAME INFECTED |
| BAI, 1934                | Artificial         | 16         | 2 (12.5%)           | 16       | 12 (75%)            |
| BAI, 1934                | Artificial         | 14         | 2 (14.2%)           | 9        | 6 (66.6%)           |
| Hardenbergh (New Jersey) | Natural            | 143        | 3 (2.4%)            | 73       | 4 (6.2%)            |
| Mills (New Jersey)       | Natural            | 142        | 12 (8.5%)           | 46       | 16 (34%)            |
| Thomsen (Denmark)        | Natural            | 266        | 9 (3.3%)            | 135      | 34 (25.5%)          |
| Tompkins (New York)      | Natural            | 24         | 4 (16.6%)           | 32       | 9 (28.1%)           |
| Tompkins (New York)      | Natural            | 222*       | 3 (1.3%)            | 0        |                     |
| Haring (California)      | Natural            | 93         | 2 (2.1%)            | 0        |                     |

\*First parturition.

lent culture of *Br. abortus*. The fraction in question is labile in nature; it is denatured by heat and by most of the common antiseptics.

Those who are concerned with the different aspects of immunity problems must constantly keep in mind that conclusive proof of artificial immunization against any disease is one of the most elusive and difficult things to obtain. This, perhaps, ap-

ple eight years ago indicate that brucellosis in swine is for the most part a self-limiting disease. These data, however, need further confirmation.

Today there is insufficient evidence to indicate exactly what rôle the infected hog plays in transmitting the disease to cattle or to human beings. On the basis of cultures received at the Michigan brucellosis laboratory, *Br. suis*, as well as *Br. abortus*, is involved in infections in cattle in many of the southern states.

TABLE IV—Summary of a Vaccination Experiment on Cattle Conducted by McEwen in England

| YEAR | NO. VACCINATED | NO. BECAME INFECTED | NO. CONTROLS | NO. BECAME INFECTED |
|------|----------------|---------------------|--------------|---------------------|
| 1st  | 109            | 4 (4%)              | 98           | 5 (5%)              |
| 2nd  | 90             | 2 (2%)              | 73           | 14 (19%)            |
| 3rd  | 38             | 0                   | 29           | 7 (24%)             |

After McEwen.<sup>8</sup>

plies more to bovine brucellosis, because of its nature, than to any other disease.

#### BRUCELLOSIS IN SWINE

The swine-brucellosis problem appears to be one which involves *Br. suis* and *Br. melitensis*. No one has yet been able to show that natural infection in swine is caused by *Br. abortus*. The epizootology surveys that have been made show that swine brucellosis is prevalent in many sections of the United States, South America, Mexico and Central Europe. A survey made in Mexico during the past year [1939] shows, on the basis of the agglutination test, more than 30 per cent of the hogs to be infected. The type of the infecting organism in hogs in Mexico, according to Dr. Jose Zozaya, has been found to be *Br. melitensis*.

Data obtained at the Michigan State Col-

#### BRUCELLOSIS IN MAN

Brucellosis is now recognized as one of the major disease problems in human beings. Veterinarians have as much interest in human brucellosis as those persons directly concerned with human health problems, primarily because it is an animal-borne disease.

The history of brucellosis in man in the western hemisphere probably began with the invasion of Mexico by Cortez. The data that have been collected in Mexico during the past year pertaining to the prevalence of brucellosis and the infecting species tend to confirm this. The present or past prevalence of human brucellosis in the United States can not be determined reliably. When one considers that the number of reported cases has increased from 24 in 1925 to 4,379 in 1938, no one can doubt that it is a widely prevalent disease.

It has now been established that human infections arise from animal sources, but the relative importance of different animal sources and their products can not be measured statistically. The bacteriologic evidence shows that in certain regions the infected goat is the chief source, in another it may be the hog, and in still another, the cow.

TABLE V—The Comparative Results of Diagnostic Tests on 100 Unselected Cases of Human Brucellosis

| TOTAL NO. CASES | AGGLUTINATION TITER |                      | OPSONIC TEST |              | BRUCELLERGEN TEST |              |
|-----------------|---------------------|----------------------|--------------|--------------|-------------------|--------------|
|                 | NO. 1:50 OR ABOVE   | NO. 1:25 OR NEGATIVE | NO. POSITIVE | NO. NEGATIVE | NO. POSITIVE      | NO. NEGATIVE |
| 100             | 25                  | 75                   | 94           | 6            | 98                | 2            |



The diagnosis of human brucellosis is often perplexing to the physician. This is due partly to the complexity of the clinical symptoms that may be encountered and partly to the difficulty of interpreting the various diagnostic tests in the absence of a positive culture. The agglutination test, which has played such an important rôle in the diagnosis of animal infections, is of limited value in the chronic form of human brucellosis. The writer and his associates have had the opportunity to study the value of the various diagnostic tests on 150 brucellosis patients a year for the past three years that were sent to the laboratory by physicians. Most of the cases were of the chronic form. The agglutination test was of a sufficient titer in only 25 per cent of those examined to indicate active infection (see table V).

Human brucellosis has been a football game for the therapist, and the submissive patient, the football. What agent has not been used with successful results in the treatment of individual cases? The successful results in many instances could be attributed to the peculiar nature of the disease rather than to the agent itself. The course of brucellosis is so erratic and its duration so indefinite that it is difficult to assess the value of any particular line of treatment. Reports of cures based on single cases or on a small series are definitely misleading.

Favorable and unfavorable reports continue to emanate from physicians pertaining to the therapeutic value of sulfanilamide and sulfapyridine in human brucellosis. The writer has observed many classical demonstrations of their failure to influence the course of the disease in hospitalized cases in both Malta and the United States. There is still to be produced positive proof that these drugs have any favorable influence on the course of the disease.

The results of *in vitro* experiments conducted by several groups of workers tend to show that sulfanilamide and sulfapyridine have some inhibiting effect on the growth of *Brucella*. The results, however,

are not impressive. While Chen<sup>9</sup> and Menefee and Poston<sup>10</sup> report that sulfanilamide has a decided sterilizing action on experimental *Brucella* infection in the guinea pig, Hamann,<sup>11</sup> on the other hand, was unable to demonstrate any therapeutic action.

Among the biologic agents that have been advocated as therapeutic agents are antisera, bacterins and brucellin.

The injection of a properly prepared antiserum in a patient suffering from the acute form of the disease very often induces a rapid fall in temperature and transitory cessation of symptoms. Blood transfusions have a similar effect. The cessation of symptoms and signs which may follow serum therapy is often mistaken for complete recovery. It is true that there are instances when complete recovery does take place, but more often there is a remission of symptoms. The possibilities of serum therapy in brucellosis have by no means been exhausted. When an antiserum is developed that will alter the encapsulated state of the bacteria, the day of serum therapy in brucellosis will have arrived.

**Brucellin Therapy Effective.**—Brucellin,<sup>12</sup> a culture filtrate developed by the writer and his associates, has been used extensively and successfully in the treatment of more than 3,000 cases of human brucellosis in the United States and Malta during the past five years. It is known that this agent has certain limitations and will not alter the course of the disease in all cases.

Attention should be focused on the prevention of human brucellosis rather than on

<sup>9</sup>Chen, B. D.: The use of sulfanilamide in experimental brucellosis. *J. Inf. Dis.*, lxiiv (1939), pp. 78-82.

<sup>10</sup>Menefee, E. E., and Poston, Mary A.: Effects of sulfanilamide on *Brucella melitensis*, var. *melitensis*, *abortus* and *suis*. *J. Bact.*, xxxvii (1939), pp. 269-276.

<sup>11</sup>Hamann, E. E., and Huddleson, I. F.: Effect of sulfapyridine (dagenan) on *Brucella abortus* *in vitro* and *in vivo*. *Proc. Soc. Exp. Biol. & Med.*, xlil (1939), pp. 555-556.

<sup>12</sup>Huddleson, I. F.: *Brucellosis in Man and Animals*. (The Commonwealth Fund, New York, 1939.)

treatment. All the facts necessary for its prevention are known, but they can not be applied effectively until certain economic questions are disposed of.

The incidence of the disease could quickly be reduced to a minimum if the owners of livestock would use more caution in the handling of infected animals, their excreta and secretions; further, by the proper pasteurization of all milk from infected animals.

When the heterogeneous chains of infection between animals and man are broken by methods which have just been described, brucellosis in man will be a disease of the past instead of a disease of the future.

No one can deny that progress has been made in the study and control of this major disease, progress of which the veterinary profession can well be proud. At the same time, let us not forget that continued research and vigilance are needed if we are to keep in the offensive position.

### Vitamin B<sub>1</sub> in Human Hospitals

A study of the vitamin B<sub>1</sub> content of hospital (human) diets showed that none of them exceeded the minimum daily requirement of 300 international units. Some of them were far below that standard. While it is generally agreed that the average American's diet is below the required minimum, studies of hospital diets have been neglected. Patients that should be receiving three to four times the minimum requirement receive much less.—*From Therapeutic Notes, Dec., 1940, p. 343.*

### Rabid Skunks

Glenn L. Dunlap, technician of the Ashe Lockhart laboratories, speaking before the Oklahoma association, emphasized the importance of controlling skunks and civet cats as well as errant dogs in the eradication of rabies. Although the skunk is susceptible to rabies it does not always die when stricken with the disease, the Doctor declared. This observation was attributed to investigations carried out in Michigan and West Virginia.

## Smallpox Vaccination De Luxe in the 1870's



*From Leslie's Weekly, April 6, 1872.*

One of the outstanding gifts of domestic animals to public health is the virus of smallpox modified to avirulence by passing the virulent virus through a bovine animal and using it epidemically to immunize the human being against that sweeping infection. Recognizing the dangers of the old practice of using scab material from vaccinated arms or vaccines otherwise contaminated, a prominent physician of the upper classes employed fresh vaccine from calves brought into his palatial office to furnish him with clean material for vaccinating his waiting clients. Three bared arms are awaiting the inoculation as the doctor collects the virus.

# Gramicidin, Novoxil, and Acriflavine for the Treatment of the Chronic Form of Streptococcic Mastitis\*

RALPH B. LITTLE, V.M.D., R. J. DUBOS, Ph.D., and R. D. HOTCHKISS, Ph.D.

Princeton, N. J.

GRAMICIDIN, an alcohol-soluble, water-insoluble substance isolated from cultures of an aerobic sporulating bacillus, when injected by way of the cistern into an infected quarter,<sup>1</sup> has been found to exert a marked bactericidal effect against *Streptococcus agalactiae*, the causal agent of the chronic form of bovine mastitis. This finding has made it appear worthwhile to compare the bactericidal effect of gramicidin with that of other agents recommended for the treatment of streptococcic infections in the udder.

Seelemann and Siemonsen,<sup>2</sup> Steck,<sup>3, 4</sup> Stableforth and Scorgie,<sup>5</sup> Udall,<sup>6</sup> and Schalm<sup>7</sup> found that the acridine derivatives (tryptoflavin, acriflavine, or entozon†) exhibit a high bactericidal effect on streptococci in the udder. Other workers have reported on the chemotherapeutic treatment of bovine mastitis by infusion of the udder *via* the teat canal with these agents or other materials. A review of the literature on this subject can be obtained from the publications just cited.

In latent cases of mastitis Stableforth

and Scorgie<sup>5</sup> reported a cure in 43 of 60 quarters, or 71.7 per cent, with entozon; while 26 of 29 quarters, or 90 per cent, were cured by treatment with acriflavine. In clinical cases of mastitis, entozon was effective in curing 35.1 per cent (13 of 37 quarters), whereas the streptococci were destroyed in nine of 12 quarters (five of eight cows) treated with acriflavine. Stableforth and Scorgie stated that in the clinically infected cases only 30 per cent were cured. In other words, in their experience the treatment was less effective in cases of mastitis which had progressed sufficiently to cause marked changes in the character of the secretion or the udder tissue. In 1940 Schalm<sup>7</sup> reported that in 11 lactating cows and 11 dry cows, of which 61 quarters were shedding *S. agalactiae*, 55 quarters or 90 per cent were cured by the use of entozon. He stated: "Using the cow as a unit, 19 out of 22 cows treated were cured. This represents an efficiency of 86.3 per cent."

## CLINICAL ASPECTS OF CHRONIC MASTITIS IN THE UDDER

When *S. agalactiae* first becomes established in a quarter, usually the infection is mild and is referred to as "latent" or "sub-clinical" mastitis. This stage can be diagnosed only by the bacteriological examination of the secretion. During the early course of the infection a periodic multiplication of the streptococci<sup>8-10</sup> in the affected quarter of most cows is associated with a rise in temperature and a slight swelling of the udder. Within 12 to 24 hours following this increase in the numbers of the streptococci the character of the secretion may

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†As defined by the Winthrop Chemical Company, Inc., Veterinary Division, "the composition of entozon granulate is as follows: 2, 3-dimethoxy-6-nitro-8-( $\gamma$ -diethylamino-B-oxypropylamino) acridine dihydrochloride, 5.88%; 2-ethoxy-6: 9 diamino-acridine lactate, 29.44%; amyl saccharine, 58.80%; sodium biphosphate, 5.88%.

<sup>1</sup>Little, R. B., Dubos, R. J., and Hotchkiss, R. D.: Proc. Soc. Exp. Biol. and Med., xlv (1940), p. 444.

<sup>2</sup>Seelemann, M., and Siemonsen, K.: Arch. wissenschaft. u. prakt. Tierheilk., lxxvii (1933), p. 10.

<sup>3</sup>Steck, W.: Schweiz. Arch. Tierheilk., lxxx (1938), p. 181.

<sup>4</sup>Steck, W.: Ein System der Tilgung des gelben Galtes. Verlag Paul Haupt. Bern und Leipzig. 1939. pp. 1-19.

<sup>5</sup>Stableforth, A. W., and Scorgie, N. J.: Vet. Rec., l (1938), p. 663.

<sup>6</sup>Udall, D. H.: The Practice of Veterinary Medicine. 3rd Ed., 1939.

<sup>7</sup>Schalm, O. W.: J.A.V.M.A., xcvi (1940), p. 20.

<sup>8</sup>Jones, F. S., and Little R. B.: 12th Intern. Vet. Cong., New York, 1934, II, p. 563.

<sup>9</sup>Little, R. B.: Proc. 29th Ann. Conv. Intern. Assn. Milk Dealers, Atlantic City, Oct. 1936, p. 71, Production Section.

<sup>10</sup>Little, R. B.: Cornell Vet., xxvii (1937), p. 297.



be altered, with the appearance of flakes, and high points in the pH, chlorides, and leucocytes. Generally when these changes in the secretion are observed, only small numbers of streptococci are shed in the milk. If the udder of each cow in the herd is carefully inspected and if the fore milk is examined by a screened strip cup, these abnormalities will probably be observed at milking by the dairyman, although these changes are not apparent in the secretion of some cows for months. A history of recurring attacks should, however, suggest to the dairyman the presence of a chronic infection, which in many instances may be attributed to *S. agalactiae*. Usually as the infection caused by *S. agalactiae* progresses, these periodic attacks tend to become more severe and to occur more frequently, resulting in a marked alteration in the character of the secretion and the development of fibrosis and atrophy of the secretory tissue. Although some advanced cases may appear to be of an acute nature, rarely do such attacks clinically resemble acute parenchymatous mastitis as is occasionally encountered in infections caused by *S. dysgalactiae*, *Staphylococcus aureus*, or certain other infectious microorganisms. However, in a herd observed by one of us (R. B. L.) *S. agalactiae* was responsible for a very acute form of mastitis.

#### MATERIAL

The cows available for treatment were from a herd supplying milk to a large dairy company in New Jersey. These cases presented varying clinical forms of chronic mastitis and may be grouped as follows: (a) animals eliminated from the milking herd (production) on account of mastitis regardless of the period of lactation; (b) cows at the termination of their respective lactation periods; and (c) those recently calved which were not suitable, because of mastitis, for the production of certified milk. In a number of instances in the (c) group, the consulting veterinarian had recommended disposal.

#### MASTITIS CONTROL MEASURES ALREADY IN FORCE IN THIS HERD

The cows are milked on a "Rotolactor" three times daily with milking machines, the vacuum being maintained at 15 inches.

The teat cups are sterilized before milking each cow.

The fore milk from each quarter of each cow is subjected to a strip cup examination before every milking. The milk of newly purchased cows and of those just freshened is bacteriologically examined before the animal is admitted to the milking herd. Group mixed samples from each unit of 50 cows are plated in blood agar six days a week. Finally, before a new cow or one which has just freshened can be passed into the milking line, a veterinarian inspects the udder by palpation and examines the secretion from each separate quarter for physical changes by the strip cup and the brom-thymol-blue test. The same examinations are applied monthly by a veterinarian to the milk and udders of each cow in the milking herd. Occasionally, veterinarians representing various medical milk commissions or boards of health make similar inspections. In the meantime any animal developing mastitis or any abnormality of the udder or teats is removed from the milking herd and is not again admitted until she has successfully passed the above inspection.

#### METHODS

*Collection of Milk for Bacteriological Examination.*—Before milking, the udder and teats were washed with a sterile cloth dampened in a chlorine solution and were then dried with another sterile cloth.

At the morning milking a sample of fore milk (3 or 4 cc.) was taken from each quarter as carefully as possible by holding the tube in a slanting position some distance away from the teat. The samples were kept chilled until plated within one-half hour after collection.

*Bacteriological Examination.*—Before a cow was treated, at least two complete laboratory examinations of the secretion from the affected quarters were made to determine the reaction of the milk and to identify the causative organisms. In some instances the milk was examined daily for a week or even longer. The bacteriological methods used throughout this study have been reported in detail elsewhere.<sup>11</sup> Briefly, they included the determination of the pH (hydrogen ion concentration), chloride content, leucocyte count (neutrophils), and the plating of 1 cc. of a 1:10 dilution of the sample in blood agar. The hemolytic properties of

<sup>11</sup>Little, R. B.: Cornell Vet., xxviii (1938), p. 23.



the streptococci found were established in blood agar, and selected colonies were further classified serologically by applying the methods of Lancefield<sup>12</sup> and Brown<sup>13</sup> to broth cultures. As an additional test following treatment 9.5 cc. of fore milk or strippings were collected in tubes containing 0.5 cc. of a mixture in equal volume of sodium azide 1:500 and brom-cresol purple (0.5 per cent).<sup>14</sup> The samples were incubated and readings made at 24 and 48 hour intervals, and a stained film was prepared from each negative sample and examined for streptococci.

**Preparation of the Teats for Injection.**—The injections were made following the morning milking and the teats were cleansed in the following manner regardless of the material conveyed to the udder. The meatus of the teat was gently washed with absorbent cotton dampened with warm soapy water, rinsed with warm water, and dried. A pledget of cotton saturated with 68 per cent alcohol was then applied to the distal portion of the teat and held there until the injection was made.

**Method of Injection.**—The injections were made with a sterile milking tube having a blunt closed end and a small rubber tube about 1½ inches in length attached at the open end. Before the injection the residual milk from the teat sinus and milk cistern was drained out by passing the milking tube back and forth from the end of the teat into the cistern.

When fluid was infused into a quarter a 1,000 cc. graduated Pyrex filtering flask (No. 5830 Corning Glass Works) with a side arm attachment was used. A rubber stopper which carried a thermometer and a glass tube that extended to the bottom of the bottle was placed in the open end. The glass tubing projecting beyond the stopper was bent at right angles and 4 feet of rubber hose was attached. A connection was made between this apparatus and the milking tube with a small glass tube. A No. 1 De Vilbiss atomizer bulb was attached to the side arm of the bottle in order to apply constant pressure during the operation. With the exception of the rubber bulb the entire apparatus was autoclaved before being used.

When smaller amounts of material were injected into the udder either a 10 or 50 cc. sterile Luer syringe was used. The rubber tubing attached to the milking tubes made a tight connection with the needle attachment on the syringe, while other injecting tubes were specially made with a needle adapter.

Some infected cows had extremely patent teat

sphincters<sup>10, 15</sup> which could not retain either small or large amounts of fluid in the udder. This condition was corrected by applying adhesive bandages (Band-Aid) to the end of the teat.

#### BACTERICIDAL AGENTS

**Gramicidin.**—Two different preparations of gramicidin have been used in this study. One preparation, lot "CC,"\* was essentially the alcohol-soluble, water-insoluble fraction separated from cultures of the sporulating bacillus described in earlier studies.<sup>16</sup> This fraction has now been found to contain, in addition to true gramicidin, another bactericidal substance which has been called tyrocidine.<sup>17</sup> The other preparation, lot RY<sub>2</sub>, was the portion of a lot similar to "CC" which is completely soluble in absolute acetone; lot RY<sub>2</sub> contains a high proportion of gramicidin with little or no tyrocidine.

Both preparations have given satisfactory results in our hands; no attempt has been made to determine the minimal amount of each preparation required for the successful treatment of bovine mastitis caused by *S. agalactiae*.

**Gramicidin by Infusion.**—Gramicidin† in amounts of 60 to 240 mg. in solution in alcohol was mixed with 1,000 cc. of sterile doubly distilled water and the temperature maintained at 40°C. After the residual milk had been removed, the cistern and teat were flushed out with 100 to 200 cc. of the watery solution of gramicidin. Immediately thereafter 800 to 900 cc. were injected under constant pressure, and allowed to remain, usually until the next milking about 8 or 9 hours thereafter.

**Gramicidin Suspended in Oil.**—In addition to plain sterile water as a vehicle for gramicidin, various kinds of oil were used. Light and heavy mineral oil, olive oil, and

\*Lot "CC" was a pool of material supplied by the following firms: Eli Lilly Co.; Lederle Laboratories; Merck and Company; Parke, Davis & Co.; Sharp and Dohme; and E. R. Squibb and Sons.

†The stock solution of gramicidin used in this work contained either 20 mg. (Lot RY<sub>2</sub>) or 40 mg. (Lot CC) of the substance per cc. of 95 per cent alcohol.

<sup>10</sup>Little, R. B.: Cornell Vet., xxvii (1937), p. 309.

<sup>15</sup>Dubos, R. J., and Cattaneo, C.: Jour. Exp. Med., lxx (1939), p. 249.

<sup>17</sup>Hotchkiss, R. D., and Dubos, R. J.: Jour. Biol. Chem., cxxxvi (1940), p. 803.

<sup>12</sup>Lancefield, R. C.: Proc. Soc. Exp. Biol. and Med., xxxviii (1938), p. 473.

<sup>13</sup>Brown, J. Howard: Jour. Amer. Med. Assn., cxi (1938), p. 310.

<sup>14</sup>Little, R. B.: Rpt. of Proc. Internat. Assn. Milk Dealers (in press).

almond oil were compared. The most satisfactory results were obtained with heavy mineral oil,\* and the following technic was finally adopted. Twenty to 160 mg. of the solution of gramicidin in alcohol were diluted with 15 cc. of doubly distilled water to which 25 to 50 cc. of sterile mineral oil were added. After the solution of gramicidin in water and oil had been partially mixed in the bottle by gentle agitation, a more suitable suspension for the injection was obtained by repeatedly drawing the mixture back and forth into the 50 cc. syringe until it became milky in appearance and less viscid. The tip of the milking tube was first dipped into lubricating jelly and then the gramicidin-oil mixture was slowly injected into the cistern, special care being taken to distribute it in different portions of the cistern. After the milking tube was removed the quarter was gently massaged, and was milked out eight or nine hours later.

*Novoxil*.—This product as yet has not been marketed for general use in the treatment of mastitis. However, it has been released for experimental purposes.† Wei-rether *et al*<sup>18</sup> were the first to report on the treatment of *S. agalactiae* infections with novoxil. They found that in three quarters studied the streptococci were not detected in the secretion for periods of from 11 to 37 days. One injection daily was less irritating than two. In no instance were the treated quarters permanently injured.

Novoxil is a 5 or 10 per cent preparation of a pure oxide of silver in mineral oil, usually injected in 10 or 14.5 cc. amounts. According to Lentz<sup>19</sup> the watery solution of silver oxide is non-irritating and non-toxic but is bactericidal. In contact with tissues the oxide is liberated as silver hydroxide. Special needles ("infusion tubes") to fit the standard Luer syringes were made by Becton, Dickinson & Co. for

the injection. These were stainless steel, 12 gauge, 2 and 2½ inches long, straight, with blunt, smooth, open ends.

*Acriflavine*.—Both 1:10,000 and 1:4,000 concentrations were used. The infusions were made in the manner described for gramicidin, except that occasionally the larger amount of fluid (800 to 900 cc.) was milked out after remaining in the udder 10 minutes. Various amounts of acriflavine were mixed with mineral oil: 0.25 Gm. dissolved in 5 cc. of water added to 240 cc. of mineral oil, or 0.05 Gm. dissolved in 5 cc. of water added to 300 cc. of oil. From 25 to 50 cc. of this mixture were injected.

#### CARE OF COWS FOLLOWING TREATMENT

The cows were milked twice daily, at 9 A. M. and 9 P. M. The animals were maintained on a grain ration low in protein. The roughage was freshly cut, dehydrated alfalfa hay. The attendant washed his hands in chlorine water before milking each cow, and the uninfected quarters were milked first.

To facilitate comparison of the three bactericidal agents, protocols will be given of each animal. It will be noted that one quarter occasionally received more than one bactericidal preparation, and also that different quarters of the same udder received different treatments.

It should be remembered while reviewing the protocols that our primary concern in this experimental study was a comparison of the effectiveness of these various agents against *S. agalactiae*, and that the effectiveness was judged for each quarter, rather than for each cow as the unit.

#### PROTOCOLS\*

*Cow 1*.—Calved March 5, 1940. Chronic mastitis in RF; atrophy, altered secretion; high

\*The following abbreviations have been used:  
Double zone beta strep. = Double zone beta streptococci.

Narrow zone beta strep. = Narrow zone beta streptococci.

Nonhem. strep. = Nonhemolytic streptococci.  
(Above types belong to Lancefield's serological group B—*S. agalactiae*.)

Bact. = Bacteriological examination.

Pos. bact. = Bacteriological examination on which strep. were identified.

Neg. bact. = Bacteriological examination on which strep. were not identified.

Gram-oil mix. = Alcohol solution of gramicidin in H<sub>2</sub>O and heavy mineral oil.

LF, RH, etc. refer to "quarter."

\*Mineral Oil Squibb (Liquid Petrolatum—Heavy Californian).

†The supply of novoxil was made available to the Walker-Gordon Laboratory Co., Inc., by E. R. Squibb and Sons.

<sup>18</sup>Wei-rether, F. J., Anderson, E. O., Johnson, R. E., Plastring, W. N., and Jungherr, E.: (In press).

<sup>19</sup>Lentz, W. J.: Vet. Ext. Quarterly, Univ. of Penn., xxxv (1935), p. 2.

pH, chloride and cell counts; nonhem. strep. RF: June 24, 28, July 3, 6, 9, 12—40 to 120 mg. gram-oil mix. (total 480 mg.); pos. bact. July 29, Aug. 2, 9, 16, 22—10 to 14.5 cc. novoxil (total 59 cc.); pos. bact. Aug. 27, 28, 29, 30, 31, Sept. 11, 12, 13, 14—40 to 80 mg. gram-oil mix. (total 420 mg.); pos. bact. (Incurable, slaughtered Oct. 7, 1940.)

**Cow 2.**—Calved Sept. 10, 1940. Chronic mastitis of long duration; questionable case for treatment. Out of production entire previous lactation. Patent sphincters; RF and RH nonhem. strep.; LF atrophied, scanty secretion; double zone beta strep. RF: Oct. 1—100 mg. gram-oil mix.; pos. bact. LF: Oct. 2—100 mg. gram-oil mix.; severe reaction, secretion blood-tinged and scanty; neg. bact. Oct. 7, 14, 15, Nov. 26, Dec. 27, 1940, Jan. 14, 1941; almost complete cessation of secretion. RH: Oct. 13—40 mg. gram-oil mix.; pos. bact.; strep. not eliminated.

**Cow 3.**—Calved Aug. 6, 1939. Chronic mastitis; advanced case; quarters indurated; nonhem. strep. in RF, LF, RH. RF: May 23, 31, June 3—1:10,000 acriflavine; 8 pos. bact., May 29 to June 20. LF: May 23, 31—1:4,000 concentration of acriflavine; solution in udder until next milking; severe reaction; neg. bact. June 3, 4, 7, 10, 14, 20. RH: May 27, 29, June 3—10 cc. novoxil (total 30 cc.); severe reaction; 5 neg. bact. June 7 to 20. Dried up June 20; calved Sept. 16, 1940. Pos. bact., RF and RH, Sept. 20, Nov. 14, 27, and Dec. 17. Neg. bact., LF, Sept. 20, Nov. 14, 27, and Dec. 27.

**Cow 4.**—Calved March 12, 1940. Chronic mastitis, induration, milk yellowish; nonhem. strep. RF and LH. RF: June 5—1:4,000 acriflavine; milked out; severe reaction; pos. bact. LH: June 5, 13—10 cc. novoxil (total 20 cc.); pos. bact. LH: severe reaction, blood-tinged fluid; cessation of secretion. (June 21, slaughtered.)

**Cow 5.**—Calved June 27, 1940. Chronic mastitis, advanced case, marked fibrosis, pendulant udder, long teats, patent sphincters; double zone beta strep., all quarters. RF: July 23, 29, Aug. 5—120 mg. gram-oil mix. (total 360 mg.); 11 neg. bact. Aug. 6 to 22. LF: July 21, 25, 31, Aug. 5—10 cc. novoxil (total 40 cc.); severe reaction; pos. bact. RH: July 23, 29, Aug. 2, 5, 11, 15—120 to 160 mg. gram-oil mix. (total 840 mg.); pos. bact. LH: July 21, 25, 31, Aug. 2, 5, 8, 11, 15—acriflavine in oil, 0.05 Gm. to 300 cc.; 50 cc. injected; pos. bact. Severely injured LH teat necessitated immediate slaughter. (Strep. apparently eliminated from RF by gramicidin.)

**Cow 6.**—Calved Jan. 29, 1940. Chronic mastitis in LF and LH; advanced lactation; 1st bact. March 2, 1940; infection LH; 2nd bact. July 13, LF involved; beta double zone strep. LF: Oct. 16—80 mg. gram-oil mix.; pos. bact.

Oct. 24, 29—80 mg. gram. in olive oil (total 160 mg.); severe reaction, fore milk blood-tinged; pos. bact. LH: Oct. 14—80 mg. gram-oil mix.; pos. bact. Oct. 24, 29—80 mg. gram. in olive oil (total 160 mg.); pos. bact. LF and LH strep. pos. on Nov. 11.

**Cow 7.**—Calved May 17, 1940. Chronic mastitis, old case, induration marked in 3 quarters; beta double zone strep. in all quarters; high pH, chlorides, and cell count. RF: July 23—120 mg. gram-oil mix.; 33 neg. bact. July 24 to Aug. 30. Infected with *S. uberis* Sept. 3; Sept. 7, 8—40 mg. gram-oil mix. (total 80 mg.); 12 neg. bact. Sept. 9-30. LF: July 21—10 cc. novoxil; severe reaction, fibrinous exudate; 28 neg. bact. July 23 to Aug. 26. Aug. 27, injured teat, *S. uberis* infection; Sept. 11, 12, 13, 14—40 mg. gram-oil mix. (total 160 mg.); neg. bact. Sept. 20, 21, 30. RH: July 23—120 mg. gram-oil mix.; 45 neg. bact. July 24 to Sept. 30 (atypical alpha hem. strep. detected 9 times). LH: July 21, 25, 31, Aug. 2—25 to 35 cc. acriflavine in mineral oil; pos. bact. Aug. 5, 27—120 mg. gram-oil mix. (total 240 mg.); 35 bact. Aug. 7 to Sept. 30; atypical alpha hem. strep. present 8 times. (Slaughtered. Milk from LF watery, occasional flakes; atrophied; beta double zone strep. eliminated from all quarters, 3 by gramicidin, 1 by novoxil.)

**Cow 8.**—Calved Sept. 1, 1940. Chronic mastitis all quarters, of long standing; RF and LF severely atrophied; partial destruction of milk cistern; infection pronounced in LF; all quarters beta double zone strep. RF: Sept. 26—120 mg. gram-oil mix.; 10 neg. bact. Oct. 3 to Nov. 27. LF: Sept. 26—120 mg. gram-oil mix.; Oct. 2—80 mg. and Oct. 10, 11, 12, 13, 14, 40 mg., of same (total 280 mg.); not cured; marked cessation in secretion; milk blood-tinged; pos. bact. Nov. 11, 25, 27. RH: Sept. 26—120 mg. gram-oil mix.; 13 neg. bact. to Nov. 27. LH: Oct. 5—40 mg. gram-oil mix.; neg. bact. Oct. 7, 23, 30, Nov. 11, but Nov. 23 reinfected. Nov. 25, 27, also pos. bact. (Cow slaughtered; strep. eliminated in two quarters by gramicidin.)

**Cow 9.**—Calved June 1, 1940. Previous lactation, occasional flakes and high pH of milk; at last calving, chronic mastitis, slaughter advised. Infection confined to RF and LF quarters; beta double zone strep. RF: July 2, 12—40 mg. gram-oil mix. (total 80 mg.); 28 neg. bact. July 14, to Aug. 14; infected with *S. uberis* on July 24; July 25—60 mg. gram-oil mix.; pos. bact. July 26, but neg. bact. after July 27. LF: July 2—120 mg. gram-oil mix.; 19 neg. bact. July 2 to 29. Infected with *S. uberis* July 20; July 31—120 mg. gram-oil mix.; severe reaction, milk blood-tinged; pos. bact. (for *S. uberis*) Aug. 14. Returned to milking line. Neg. (for beta strep.) bact. Sept. 6, Oct. 9, Nov. 14, 27, Dec. 17, 1940, Jan. 14,



1941. (Original beta strep. infection eliminated by gramicidin.)

*Cow 10.*—Calved Oct. 5, 1939. Previous history, recurring attacks of chronic mastitis; beta, double zone strep. all quarters; high pH, chlorides, and cell count. RF and LF: May 27, June 5, 10—10 cc. novoxil (total 60 cc.); severe reaction; fibrinous exudate; neg. bact. RH: May 27, infused with 160 mg. gram.; pos. bact. June 5, infused with 1:4,000 concentration acriflavine; severe reaction; neg. bact. LH: May 27, infused with 120 mg. gram.; pos. bact. June 5, 10 cc. novoxil neg. bact. June 18, returned to milking line. Neg. bact. June 25 and July 5. No recurrence of flaky milk, etc. Aug. 21, dried up. Calved Sept. 12. Neg. bact., Oct. 29, 30, Nov. 11, 23. Died Nov. 28, 1940 of pneumonia. (Complete elimination of infection, 3 quarters by novoxil and 1 by 1:4,000 concentration acriflavine.)

*Cow 11.*—Calved Sept. 24, 1939. Chronic mastitis, advanced lactation, slaughter advised if not cured; beta double zone strep. in RF and LH; high pH, chlorides, and cell count. RF: May 23, 31, June 10—acriflavine 1:4,000; severe reaction; pos. bact. June 15—10 cc. novoxil; severe reaction; neg. bact. LH: May 27, 29, June 3—10 cc. novoxil (total 30 cc.); severe reaction; neg. bact. Aug. 20, dried up. Calved Oct. 8, 1940. Neg. bact. Nov. 14, 27, Dec. 17, 1940, and Jan. 14, 1941.

*Cow 12.*—Calved July 27, 1940. Chronic mastitis in LF and RH; patent sphincters; nonhem. strep. LF Aug. 6—120 mg. gram-oil mix. RH: Aug. 8—120 mg. gram-oil mix. 17 neg. bact. Aug. 10 to 28. Returned to milking line. Neg. bact. Sept. 6, Oct. 9, Nov. 14, 27, Dec. 17, 1940, Jan. 14, 1941. (Strep. apparently eliminated from both quarters by gramicidin.)

*Cow 13.*—Calved Aug. 2, 1940. Chronic mastitis, advanced case, in RH and LH; RH atrophied; beta double zone strep. RH: Oct. 1—100 mg. gram-oil mix.; pos. bact. Oct. 10, 11, 12—20 mg. gram-oil mix. (total 60 mg.); Oct. 24—80 mg. gram. in 35 cc. olive oil; pos. bact.; Nov. 5—80 mg. gram. in 50 cc. heavy mineral oil; neg. bact. Nov. 6, 9, 11, 16, 18, 19, 22, 23, 25, 27, Dec. 17, 1940, and Jan. 14, 1941. LH: Oct. 1—100 mg. gram-oil mix.; pos. bact.; Oct. 10, 11, 12 13—40 mg. gram-oil mix. (total 160 mg.); neg. bact. Neg. bact. Oct. 13, 14, 15, 16, 17, 18, 23, 28, 30, 31, Nov. 5, 11, 16, 18, 19, 22, 23, 25, 27, Dec. 17, 1940, and Jan. 14, 1941. Returned to milking line. (Strep. apparently eliminated from both quarters by gramicidin in oil.)

*Cow 14.*—Calved Aug. 29, 1940. Chronic mastitis, two quarters; nonhem. strep. Easy milker; patent sphincters; high pH, chlorides, and cell count. RF and LH: Oct. 10, 11, 12, 13—40 mg. gram-oil mix. (total 320 mg.). 14 neg. bact. Oct. 14 to Nov. 4. Returned to

milking line as cured. Neg. bact. Nov. 14, 27, Dec. 17, 1940, Jan. 14, 1941. (Strep. eliminated from two quarters by gramicidin.)

*Cow 15.*—Calved Jan. 27, 1940; twins. Removed from milking line July 13; mastitis in RF; nonhem. strep. RF: Sept. 4—120 mg. gram. in oil. Neg. bact. Sept. 5, 6, 7, 9, 10. Returned to milking line. Neg. bact. Oct. 9, Nov. 14. Dried up Nov. 25. (Strep. apparently eliminated from quarter by gramicidin.)

*Cow 16.*—Calved June 27, 1940. Removed from milking line Sept. 12; mastitis in RF and LF; fibrosis, patent teat sphincters; altered secretion; beta double zone strep. RF: Sept. 23—100 mg. gram-oil mix. 14 neg. bact. Sept. 25 to Oct. 15. LF: Sept. 27—120 mg. gram-oil mix; acute reaction; fore milk blood-tinged; neg. bact. Returned to milking line Oct. 16. Neg. bact. Nov. 14, 27, and Dec. 17, 1940, and Jan. 14, 1941. (Strep. apparently eliminated from both quarters by gramicidin.)

*Cow 17.*—Calved Oct. 6, 1939. Chronic mastitis; advanced lactation; beta double zone strep. in RF and LF; high pH, chlorides, and cell count. RF: June 24—40 mg. gramicidin in 10 cc. H<sub>2</sub>O; severe reaction; pos. bact. July 2—80 mg. gramicidin in 10 cc. H<sub>2</sub>O; severe reaction; 8 neg. bact. July 5 to 19. LF: June 24, July 2, 9, 12—10 cc. novoxil (total 40 cc.); reacted severely; neg. bact. on July 17, 18, 19, 20. July 20, dried up. Calved Dec. 20. Neg. bact. Dec. 27, 1940, Jan. 14, 1941.

*Cow 18.*—Calved Aug. 20, 1939. Chronic mastitis, advanced lactation; incompetent sphincters due to surgical operation; beta narrow zone strep. RF, RH, LH: high pH, chlorides, and cell count. RF, RH, LH: June 19—10 cc. of novoxil injected (total 30 cc.); neg. bact. June 25, 27. June 28, dried up udder. Calved Sept. 23, 1940. Pos. bact. Sept. 26; beta strep. in RF, LF, RH. Fore milk LF blood-tinged. LH nonhem. strep. Bact. Nov. 14, 27, same as Sept. 26. Slaughtered Dec. 16.

*Cow 19.*—Calved Nov. 1, 1939. Chronic mastitis, advanced case; three quarters affected and indurated; patent sphincters; beta double zone strep. LF and LH; nonhem. strep. RF. RF: May 23, 31, June 3—acriflavine 1:4,000 concentration; neg. bact. June 4, 7, 10. LF: May 27, 29, June 3, 18—10 cc. novoxil (total 40 cc.); severe reaction, high chlorides and cell counts, milk thick, fibrinous exudate; neg. bact. June 17, 21. LH: May 23, 31, June 3, 10—1:4,000 concentration acriflavine; severe reaction; pos. bact. June 21, dried up. Calved Oct. 12, 1940; twins; retained placenta. Oct. 22, Nov. 14, 27, Dec. 17, 1940, and Jan. 14, 1941, pos. bact. for LH; same dates, neg. bact. for RF and LF.

*Cow 20.*—Calved Sept. 27, 1940. Chronic mastitis RF; beta double zone strep.; patent



teat sphincter. RF: Oct. 28—80 mg. gramicidin in olive oil; pos. bact. Nov. 5—80 mg. gram.-oil mix.; pos. bact. Nov. 14—80 mg. gram.-oil mix.; pos. bact. Nov. 20—80 mg. gram.-oil mix.; pos. bact. Nov. 27, Dec. 2—120 mg. gram.-oil mix. (total for last two dates, 240 mg.); pos. bact. Treatment discontinued.

*Cow 21.*—Calved Oct. 1, 1939. Chronic mastitis in all quarters; induration, high pH, chloride, and cell counts; beta double zone strep. all quarters. RF and LF: June 25, July 2—10 cc. novoxil (total 40 cc.). RH: June 25—20 mg. gram. in 11 cc. H<sub>2</sub>O; June 29—40 mg. gram.-oil mix. LH: June 25—20 mg. gram. in 11 cc. H<sub>2</sub>O; June 28, July 3—60 and 80 mg. gram.-oil mix.; 6 bact. neg. all quarters, July 4 to 15. July 16 returned to milking line. Neg. bact. July 26. Dried up udder. Oct. 6, 1940, calved. Mastitis in LF, quarter firm, milk abnormal, nearly complete cessation in secretion. *Staphylococcus aureus*. Similar staphylococci in LH—infection less severe. Neg. bact. for strep. Oct. 22, 23, Nov. 1, 2, 11. (Slaughtered on account of mastitis LF.)

#### COMMENT

Of 53 quarters of 21 cows treated with the various bactericidal agents, the streptococci apparently were destroyed in 34 quarters (64 per cent). Of the 53 quarters studied, 32 were treated with gramicidin, the streptococci were eliminated from 21 (65 per cent), in 11 on a single treatment, while 10 required additional injections. Eleven quarters were unsuccessfully treated with gramicidin either by injection or infusion.

It is interesting at this point to compare the reaction of treated animals to the two methods of administration of gramicidin which have been used, namely: infusion and injection.

Following infusion of the large volume of gramicidin diluted in aqueous media a swelling of the treated quarter within two to three hours after treatment was observed; the temperature rose to levels up to 41° C. after five to six hours; both the swelling and the temperature subsided by the time of the next milking. Although blood was observed in the milk in only one case,<sup>1</sup> the secretion was grossly altered for two or three days after treatment in all cases. It is our conviction that the reaction was severe enough to render unsafe any subsequent treatment earlier than 10

to 15 days after the first infusion. It is well known<sup>20</sup> that any aqueous medium infused in large amounts into the cow's udder will cause a reaction. In our hands Ringer's solution proved even more irritating than distilled water as a vehicle for gramicidin. It is possible, therefore, that most of the severe reactions which were obtained were not due solely to the effect of gramicidin itself; this is rendered more evident when one considers the results obtained when gramicidin was injected with mineral oil.

The gramicidin-oil mixture when injected according to the method described on pages 191-192, using 20 to 80 mg. of gramicidin, produced less swelling and fever; the fore milk appeared grossly altered for only one or two milkings. In general the reaction was so mild that it was found possible to repeat the treatment on the second or third day. However, it was found that in some instances more than two or possibly three treatments with 40 to 120 mg. excited the irritation already existing in the quarter and caused further damage to the secretory tissue. This excitation was accompanied by an increase in the numbers of streptococci, perhaps resulting from the severe alteration in the character of the secretion which was conducive to their multiplication. Provided it is found advisable to repeat the injections in order to destroy the streptococci, daily treatments with 20 to 40 mg. can be safely made after a week's rest without danger of damaging the affected quarter unless it is severely involved. In some cases these daily treatments were continued for five successive days. Obviously, it is likely that on repeated daily injections the bactericidal agent in oil comes in contact with portions of the cistern which might not be reached on a single treatment.

#### OIL SUSPENSION COUNTERACTS IRRITATION

The gramicidin-oil mixture is not a stable suspension, so obviously upon reaching the cistern the watery solution is released. It is felt, therefore, that the oil counteracts

<sup>20</sup>Hucker, G. J., and Lee, D.: N. Y. State Agric. Exp. Sta., Bul. 205 (1932), 35 pp.

much of the irritation which might be caused by the injection of gramicidin in aqueous media. It is also possible that the mineral oil temporarily inhibits the development of the streptococci. In 16 quarters injected with oil alone (mineral, olive, and almond oils) before treatment was begun, the growth of the streptococci in the affected quarters was retarded for several days. In one instance of a mild infection no streptococci were shed in the secretion for nine days following the injection of heavy mineral oil. Although the number of cases treated with gramicidin in olive oil or almond oil is too small to warrant definite conclusions, there is no indication at the present time that either one is more effective than heavy mineral oil as a vehicle for gramicidin.

It may be interesting to refer to the paper of Garrison and Turner,<sup>21</sup> who reported that irrigation of the udder with 750 ml. of thin paraffin oil caused more disturbance than an equal amount of distilled water administered alone, in the same manner, to another quarter of the same udder. This apparent conflict with our findings with mineral oil may be attributed to (a) the large quantity injected (we used not over 50 cc. of mineral oil); (b) the dispersal throughout the entire udder (our injections of mineral oil were confined to the cistern) and (c) the fact that the paraffin oil used by Garrison and Turner may not have been so highly purified as mineral oil prepared for human consumption.

Novoxil was used in our study for the treatment, in all, of 17 quarters, in 10 of which (58 per cent) the streptococci were destroyed. Only one quarter which had not been previously injected with some other agent responded to a single treatment. The streptococci were destroyed by novoxil in two quarters following an unsuccessful treatment with acriflavine and gramicidin by infusion. On the other hand in no instance were these and other cases which were unsuccessfully treated by

gramicidin in oil cured by subsequent treatments with novoxil.

Nine quarters were treated by acriflavine, of which seven were infused and two injected with the dye in mineral oil. The streptococci were eliminated by infusion of the acriflavine in three quarters (42 per cent) and it was found that a 1:4,000 concentration of acriflavine was preferable to a 1:10,000 concentration.

The number of quarters treated was too small to justify a comparison of the effectiveness of the materials used. It may be stated, however, that the injection of gramicidin-oil mixtures directly into the cistern appears to be as effective as, and less laborious than, the administration of gramicidin by infusion, and moreover permits repeated injections at short intervals of time. It should be pointed out, however, that in selected cases the injection of the larger volume of the aqueous solution of gramicidin may offer advantages over the injection of the gramicidin-oil mixture. If the infection is confined to the smaller ducts or to small scattered areas throughout the cistern or the body of the gland, these portions may be reached more readily by the infusion method of administration. In other words, no matter how careful an attempt is made to distribute the gramicidin-oil mixture throughout the cistern, the bactericidal agent may not pervade sufficiently to cover the entire area of the cistern. The unsatisfactory distribution of gramicidin throughout the udder may account for the unfavorable results with the gramicidin-oil treatment in some quarters regarded as being mildly involved.

It was not possible to work out a satisfactory combination of acriflavine with oil, so this dye did not receive a thorough trial.

Of the two preparations, gramicidin and novoxil, both suspended in mineral oil, the former on a single treatment, with the dose properly adjusted (20 to 80 mg.) produced less irritation in the udder. This fact was ascertained chiefly by the character of the secretion following the injection and by the laboratory examination.

As already stated, following a gramicidin

<sup>21</sup>Garrison, E. R., and Turner, C. W.: Mo. Agric. Exp. Sta., Res. Bul. No. 234 (1936).

treatment when the smaller amounts were used (20 to 80 mg.) the fore milk might be abnormal in appearance for a day or so, containing a few small yellow clots of pus. However, with novoxil the fore milk contained a large amount of debris, composed chiefly of cells and a fibrinous exudate, which occasionally persisted for nearly a week. With a 10 per cent suspension, particles of silver were detected in the blood-agar plates as long as a week following the injection. In quarters receiving novoxil, the pH, chlorides, and cell counts were higher, indicating a more severe damage to the secretory tissue. Furthermore, some quarters were tender at milking for as long as two weeks following the last injection. Possibly an explanation for the difference in the reaction of the udder to these agents is the fact that novoxil is rapidly absorbed, thereby prolonging its action on the tissue, whereas gramicidin, penetrating less into the tissues, exhibits greater selective affinity for the streptococci existing on the mucosa. That novoxil may be somewhat more toxic to the udder tissue is also suggested by the fact that in several cases treated with this agent (both in the present and in another study) the appearance of *Staphylococcus aureus* in the treated quarters resulted in a more severe infection than in quarters treated with gramicidin.

#### DISCUSSION

The complete and permanent disappearance of streptococci from the infected quarters is the final criterion for the evaluation of any method of treatment of the chronic form of bovine mastitis. How long then should the treated quarters be kept under observation before they are pronounced cured? Should they be observed during one or more lactations, or only for a reasonable time following the disappearance of the streptococci from the secretion? In this respect it must be recalled that many cows requiring treatment present teat sphincters which are naturally patent<sup>15, 22</sup> or in which patency has been induced by

surgical procedures or injuries. Such cows, in addition to those with the fibrotic quarters frequently associated with an altered secretion, are more likely to become reinfected with streptococci or udder micrococci than cows with normal udders and teats. In other words, the mild or latent cases with normal teat sphincters in which the disease has not progressed sufficiently to damage the secretory tissue severely should be a better risk.

Furthermore, in mastitis-infected herds where *S. agalactiae* is the causative organism it seems possible that the reappearance of infection in a treated quarter might be due to reinfection by a similar cultural or serological strain. To rule out this possibility it would be necessary to isolate the cows or maintain them in herds free from the chronic form of mastitis caused by *S. agalactiae*.

Steck<sup>23</sup> and Minett<sup>24</sup> mentioned that in mild infections where the quarters are shedding small numbers of streptococci there may exist a cultural latency for as long as six months in which the streptococci are not identified in the milk. It was suggested by Minett<sup>24</sup> that the usual cultural methods employed are not capable of detecting these small numbers of streptococci when a small amount of milk is studied unless some enrichment methods are used.

In the 21 cases presented here, as well as in others not included with this group, the absence of streptococci in the secretion for at least two weeks following the injection usually indicated their complete disappearance. After this interval, in only one instance did the same cultural type of streptococcus reappear in a quarter treated with gramicidin. Some of the cows have been observed for over six months, while the milk from others has been examined daily for as long as 81 days.

In the evaluation of the results of chemotherapy in bovine mastitis certain factors which influence the efficacy of the treatment should be considered.

<sup>23</sup>Steck, W.: Schweiz. Arch. Tierheilk., lxxviii (1936), p. 555.

<sup>24</sup>Minett, F. C.: Jour. Comp. Path. and Therap., III (1939), p. 266.

<sup>22</sup>Little, R. B.: Vet. Ext. Quarterly, Univ. of Penn., April 15 (1939).



I. *The site of the chronic infection in the udder:* Certain observations of Steck<sup>25</sup> relative to the treatment of bovine mastitis bring out some important facts in regard to this matter. He said:

Repeated observations in the course of our investigations seemed to suggest that the lower portion of the mammary gland was not only the main seat of the infection but also the part most difficult to sterilize. *The greatest difficulty encountered in the chemotherapy of agalactiosis seemed not to be to reach the high, remote portions of the gland, as is so often believed, but to get at the streptococci nesting in the region of the milk cistern, even its teat portion.*

Thus it would seem that the treatment of bovine mastitis should be concentrated on an attempt to sterilize the cistern rather than to infuse the entire quarter. In fact, it was observed that some quarters, unsuccessfully treated with gramicidin by infusion or by the injection of a small amount of gramicidin in water, were later apparently sterilized by a single treatment of novoxil. This suggested the advantages of administering a bactericidal agent in a vehicle which might be retained in the cistern and not dispersed throughout the gland.

II. *The selection of cases suitable for treatment:* In discussing this phase of the problem, the observations of Stableforth and Scorgie<sup>5</sup> should be cited, as follows:

"Firstly, there can be little hope that a chronically affected udder, often markedly indurated, will regain its function and, secondly, the chances of cure are very considerably greater in cases which are treated early. . . . In order that cases may be treated early it is essential that periodical bacteriological examinations of milk shall be made, for only in this way can infections be caught in the early stages. In fact, regular cultural examination of milk samples and chemotherapeutic treatment may be regarded as complementary."

The results of the study here reported on the chemotherapeutic treatment of 21 cows, in addition to other treated cases, agree with the finding of Stableforth and Scorgie in that latent or mild cases of infection respond to treatment more readily than advanced cases of the disease. It is impera-

tive, therefore, in the treatment of bovine mastitis (a) that the organisms responsible for the mastitis be identified by cultural or serological methods, and (b) that the degree of infection be ascertained by the physical examination of the udder and secretion.

III. *The stage of lactation of the cow most suitable for treatment:* Steck, Udall, Stableforth and Scorgie, and Schalm cite advantages of treatment toward the end of the lactation period or when the cow is dry. Possibly the main reason for this selection is to avoid any undue disturbance which might affect production and cause a loss of revenue to the dairyman. Perhaps by infusion cows can be treated more satisfactorily at this time. On the other hand, one advantage with the gramicidin-oil treatment is that on the whole the results were more encouraging when the treated cows were in a full milk yield. In a number of cases the animals were out of production for only short periods, and apparently the treatment had little effect on the subsequent milk yield. The physiological changes which occur in the secretion and udder of many cows in advanced lactation may render questionable the feasibility of successfully treating them at this time.

#### SUMMARY

It may be too early to make final suggestions concerning the method of application of gramicidin. It appears justified, however, to suggest that in cases where the streptococci are not eliminated by two treatments, or by daily injections of small amounts of the gramicidin-oil mixture, it may be of advantage to utilize large volumes of dilute aqueous solution of gramicidin.

It must be kept in mind, of course, that too extensive treatment with gramicidin in any form or possibly with other bactericidal agents may result in damage to the secretory tissue, and it is obvious that any method of treatment, to be considered successful, must not only eliminate the streptococci but leave the animal in a condition suitable for the production of milk of high quality.

<sup>25</sup>Steck, W.: Cornell Vet., xxv (1935), p. 1.



The present report considers (a) a discussion of the site of infection in the chronic form of mastitis, (b) methods of diagnosis, (c) selection of cases suitable for treatment, (d) a discussion of the bactericidal agents used in the treatment of udder infections, (e) protocols of the cases treated, and (f) methods of administration.

Three different types of bactericidal agents, namely, gramicidin, novoxil, and acriflavine, were used in the treatment of 53 quarters of 21 cows. The streptococci apparently were destroyed in 34 quarters (64 per cent). Of 32 quarters which received gramicidin, the streptococci were eliminated from 21 (65 per cent)—in 11 on a single treatment, while 10 required additional injections. Medication was ineffective in 11 quarters. Of the 17 quarters injected with novoxil the streptococci were eliminated from 10 (58 per cent). Only one quarter which was not previously treated with some other agent responded to a single treatment with novoxil. Of seven quarters treated with acriflavine by infusion the streptococci were eliminated from three (42 per cent).

### Encephalitis in Man and Certain Paralyzes in Animals

The close resemblance of Wernicke's polioencephalitis of man and Chastek paralysis of foxes is the subject of an editorial in *The Journal of the American Medical Association*.<sup>1</sup> Poliomyelitis of this type is attributed to vitamin B<sub>1</sub> deficiency in the presence of an adequate supply of other vitamins. Chastek paralysis in foxes as was shown by Green (R. G.) is brought about by eating fish. Fish, like alcohol, in some way unknown, destroys vitamin B<sub>1</sub> when fed in excess of 10 per cent or more of the total diet. The deficiency in foxes occurs mainly between November and May when the vitamin intake is apt to be low.

Another disease of the same general na-

ture is Teschen paralysis of hogs which Kment<sup>2</sup> has observed in hogs since 1929. The cause is a filterable, neurotropic virus. The disease has been called *encephalomyelitis nonpurulenta enzootica suum*. It involves the posterior quarters and sometimes also the anterior extremities. The animals die of respiratory paralysis. The symptoms and microscopic appearance of the central nervous system strikingly resemble poliomyelitis of man. Franchiger (*abst. J.A.M.A., Jan. 1, 1938, p. 74, and March 25, 1939, p. 1202*) observed poliomyelitis in a heifer and in hogs which the author believes was Teschen paralysis. He also points out the importance of coöperation between the physician and veterinarian in the study of these closely related neurotropic diseases.

"Work at several state experiment stations, at the agricultural research center and regional poultry laboratories indicates that genetic resistance to the fowl paralysis complex exists in many strains of poultry," says J. Holmes Martin of the Regional Poultry Research Laboratory at East Lansing, in discussing the subject in the *Country Gentleman*.

Vitamins E and B are now used universally in the treatment of the muscular atrophy of infantile paralysis. An article on the subject by Dr. Simon Stone of New Hampshire may be found in the June 1 (1940) issue of *The Journal of the American Medical Association*.

The National Institute of Health is conducting a large-scale test of the population for susceptibility to infantile paralysis. With facts in this respect established, fighting the disease would be easier. It may solve the mystery as to why adults resist the disease.

<sup>1</sup>Kment, A. Teschen Paralysis in Hogs and Possible Relationship to Disorders of the Central Nervous System in Human Subjects: Importance of Coöperation between Physician and Veterinarian. *Partial Index*, xxxvi (July 12, 1940), p. 769. *Abst. J.A.M.A.*, cxvi (Feb. 1, 1941), p. 446.

*J.A.M.A.*, cxvi (Jan. 18, 1941), p. 234.

# The Nutritional Deficiency Diseases of Chickens

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FEEDING CHICKENS a ration which is lacking or greatly deficient in one or more of the essential nutritive substances frequently causes the development of morbid processes with characteristic symptoms. Such morbid processes are called nutritional deficiency diseases. With the exception of perosis, resulting usually from manganese deficiency, and hyperplastic goiter, resulting from iodine deficiency, all of the known nutritional deficiency diseases of chickens are due to the feeding of rations inadequate in certain specific vitamins. They are made evident by retarded growth, loss of weight, rough feathering, lameness, paralysis, convulsions, hemorrhages, tissue degeneration and other abnormalities.

## NUTRITIONAL DEFICIENCY DISEASES CAUSED BY A LACK OF FAT-SOLUBLE VITAMINS

The fat-soluble vitamins required by chickens are vitamin A, vitamin D, vitamin E ( $\alpha$ -tocopherol), vitamin K and the anti-gizzard-erosion factor. A deficiency of any of these vitamins in the ration results in the development of characteristic symptoms.

Vitamin A is a colorless compound found only in animal tissue. Fish oils generally contain only true vitamin A while in butterfat both true vitamin A and carotene are present. Carotene and several of the other carotenoid pigments are known as provitamin A or the precursors of vitamin A. These pigments are converted into true vitamin A in the liver of the chicken. They are present in fresh green grass, alfalfa meal, yellow corn, certain vegetable oils and other materials.

A lack of vitamin A in the ration of chickens results in slower growth, lowered disease resistance and increased mortality.

\*From the Department of Poultry Husbandry, Cornell University; presented before the Section on Poultry at the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

The secretions of the intestinal mucous glands, the salivary glands and the tear glands fail. The margins of the eyelids become granular. Infection may occur, resulting in the production of a viscous fluid which frequently causes the eyelids to stick together. Vitamin A deficiency also may be manifested by the presence of creamy white pustules in the roof of the mouth and along the esophagus. Urates accumulate in the ureters and in the tubules of the kidneys so that these organs are enlarged and pale. The nervous mechanism is affected in many instances with the result that afflicted chickens walk in a wobbly, zigzag manner. When the eyes are badly affected, vitamin A deficiency in chickens is sometimes called xerophthalmia. It also has been called "nutritional roup."

Vitamin D exists in at least ten forms, two of which have been identified chemically. One of these is called irradiated ergosterol or calciferol and the other irradiated 7-dehydrocholesterol. The latter form of vitamin D appears to be just as effective, rat unit for rat unit, for feeding chickens as the vitamin D of cod liver oil, while the former is at the most only about one twentieth as effective. For this reason irradiated ergosterol is rarely, if ever, used in poultry rations. The chief sources of vitamin D for feeding chickens are cod liver oil, tuna liver oil, sardine oil and other fish oils.

A lack of vitamin D in poultry rations, in the absence of exposure to direct sunlight, results in the development of rickets. In this disease an upset occurs in the mechanism involving the absorption and retention of calcium and phosphorus as a consequence of which these minerals are not deposited in the bones, or only to a slight extent. Rickets in chickens is characterized by a stilted, stiff-legged gait and an ungainly manner of balancing the body. Enlargement of the hock joint, beading of the rib

ends, spinal curvature and crooked breast bones also may develop. In hens lowered egg production, the laying of thin-shelled eggs and failure in hatchability occur as well as rickets.

In chicks a diagnosis of rickets is readily made by dissecting the tibia, splitting it longitudinally at the distal end and examining the metaphysis by means of an appropriate procedure. In extreme rickets a typical broad rachitic metaphysis develops with an irregular line of demarcation between it and the diaphysis.

Vitamin E in a pure state is a white, crystalline compound possessing the chemical name,  $\alpha$ -tocopherol. It is found in cereals, wheat by-products and leafy green plants. Wheat germ oil is especially rich in this vitamin. It is readily destroyed by the products of the chemical reactions which occur in the development of rancidity in fats and oils.

A prolonged deficiency of vitamin E causes poor fertility and hatchability by producing sterility in the male fowl and reproductive failure in females. The deficiency causes the development of degenerative changes in the testes of the male which may result in complete testicular atrophy, thus rendering the bird permanently sterile. In females only the capacity to produce eggs that will hatch is affected. During incubation the rate of growth and differentiation of the embryos are slow and some embryos die during the first two days due to a failure of the circulatory system. A critical period in the development of the embryos occurs about the fourth day. Embryos which survive the early critical stages are frequently subject to hemorrhages and other abnormalities.

The recent experimental work showing that synthetic vitamin E prevents the development of nutritional encephalomalacia points to the conclusion that it is a manifestation of a deficiency of this vitamin in chicks. Chicks afflicted with this nutritional deficiency disease suddenly become prostrated, lying with legs outstretched and spastic and toes flexed. The head is retracted and often twisted laterally. Before becoming completely prostrated the gait

and other movements are often incoördinate. Upon autopsy lesions are found in the cerebellum and sometimes in the cerebrum. In many chicks necrotic reddish or brownish areas can be seen by inspection upon the surface of the cerebellum. Small hemorrhages, upon sectioning the cerebellum, may be found in the central white matter. In chicks fed low-fat rations the



White Leghorn cockerel suffering from vitamin A deficiency.

symptoms of vitamin E deficiency appear to be subcutaneous edema and edema of the heart and pericardium rather than necrosis of the brain.

Vitamin K is a colorless compound the chemical formula of which was determined during the past year. It is present in fresh green plants, alfalfa meal, meat scrap, fish meal and other animal by-products. It is readily formed in animal products by bacterial action. A number of somewhat simpler but related chemical compounds have been found to have vitamin K activity.

A lack of this vitamin greatly delays the clotting time of the blood, and chicks fed a deficient ration bleed to death from any injury or bruise which causes rupture of blood vessels. Hemorrhages may occur subcutaneously, intramuscularly or intraperitoneally, and in any part of the chick's body. The hemorrhages vary in size and appear as the only symptoms of a deficiency of vitamin K. In chicks fed a vitamin-K-free ration they occur at from 5 to 14 days of age, depending upon the amount of the vitamin contained in the egg. The mortality is frequently high.

The anti-gizzard-erosion factor has been



claimed to be fat-soluble by one group of investigators and non-fat-soluble by another group. It is possible that more than one factor is involved in the prevention of gizzard erosions. Chondroitin, a constituent of cartilaginous tissue, has been reported to prevent gizzard erosions and also the saponifiable fraction of the fat of alfalfa. It also has been shown that cholic acid of the bile is an effective preventive agent. It may be that in order to maintain the gizzard in a normal state, the production of bile by the liver is involved.

The anti-gizzard-erosion factor is so referred to because a deficiency of this factor in the ration causes a gizzard disorder characterized by swelling and necrosis of the secreted lining of the gizzard. Eroded, crater-like lesions frequently develop. They have been observed in chick embryos as early as 11 days and in day-old chicks. Growth does not appear to be affected by a deficiency of this factor. Undersized gall bladders have been observed in chicks suffering from gizzard erosions.

#### NUTRITIONAL DEFICIENCY DISEASES CAUSED BY A LACK OF WATER-SOLUBLE VITAMINS

The water-soluble vitamins required by chickens are vitamin B (thiamin), vitamin G (riboflavin), vitamin B<sub>6</sub> (pyridoxin), the antidermatosis vitamin (pantothenic acid) and a number of other factors which have not yet been isolated and identified chemically. A deficiency of all the known water-soluble vitamins required by chickens results in the development of nutritional deficiency diseases and several of those not yet identified are reported as resulting in the development of characteristic symptoms.

Vitamin B in a pure state is a colorless, crystalline compound possessing the chemical name, thiamin. It is present in fairly large amounts in cereals, wheat by-products, milk by-products and fresh green plants. The germ of cereals and dried yeast are specially rich in this vitamin.

A lack of vitamin B causes loss of appetite, emaciation, impairment of digestion, general weakness and frequently convulsions. The disease in chickens is known as

polyneuritis. Day-old chicks, placed upon a vitamin-B-free ration, develop polyneuritis within nine to twelve days. The symptoms of vitamin B deficiency in chicks and in mature birds are similar.

Vitamin B<sub>6</sub> is a white, crystalline compound which has only recently been identified chemically. It has been given the chemical name, pyridoxin. The cereals, wheat by-products, cane molasses and dried yeast are good sources of vitamin B<sub>6</sub>.

It was not known until the past year that vitamin B<sub>6</sub> is required by chickens. The symptoms of a deficiency of this vitamin are reported to be slow growth, depressed appetite and inefficient utilization of food followed in some cases by spasmodic convulsions and death. An abnormal, jerky gait is occasionally shown. The symptoms resulting from a deficiency of vitamin B<sub>6</sub> are apparently somewhat similar to those caused by a deficiency of vitamin B.

Vitamin G is a yellow, crystalline compound bearing the chemical name, riboflavin. When it is exposed to blue and ultraviolet light, it fluoresces green. It is readily destroyed by these rays of light. Good sources of this vitamin for feeding chickens are milk by-products, fresh green plants, alfalfa meal, dried liver, dried yeast and certain by-products of the fermentation and distilling industries.

A lack of vitamin G causes growth failure and a high mortality in chicks. Besides these effects a curious paralysis develops which is sometimes called "nutritional leg paralysis." It involves the legs and feet only and occurs in two stages: a preliminary stage which is curable and a chronic stage which is incurable. Nutritional leg paralysis is characterized by the sudden appearance of chicks walking on their hocks with the toes curling inward. The chicks otherwise seem to be in excellent health. Chicks fed a ration only partially deficient in this vitamin often recover spontaneously. The severe cases of the paralysis show marked hypertrophy and softening of the sciatic and brachial nerves which are usually discernible by inspection. These symptoms are most pronounced and most often observed in the sciatic nerve.



The nerves occasionally reach a diameter of four to five times their normal size.

In mature chickens a deficiency of vitamin G results in poor hatchability and high embryonic mortality. The requirement for



White Leghorn cockerel afflicted with rickets.

hatchability is considerably higher than that for egg production and maintenance of health. Embryologic studies of the eggs of hens fed a diet very low in this vitamin have shown that "nutritional leg paralysis" is present in 19- to 20-day-old embryos which died at that time. Myelin sheath degeneration of the sciatic nerves of these embryos has been observed.

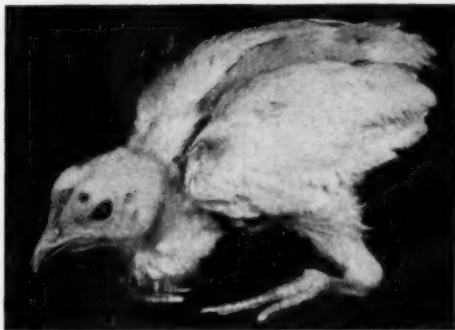
The anti-dermatosis vitamin, frequently called the filtrate factor or chick anti-pellagric vitamin, has been shown within the past year to be pantothenic acid, a factor essential for the growth of yeast and certain bacteria. It has been synthesized recently and its correct chemical formula is now known. Pantothenic acid is widely distributed in nature. Cane molasses, liver meal, dried yeast, peanut meal and milk by-products are among the better sources of this vitamin.

When pantothenic acid is lacking in the diet, chicks grow slowly and feather development is extremely ragged. Within 12 to 14 days a pellagra-like syndrome develops.

The eyelids become granular and stick together as a result of the production of a viscous exudate. Crusty scabs appear at the corners of the mouth and sometimes around the vent. The skin on the bottoms of the feet often becomes thickened and cornified. Small fissures may develop in which at times there is slight hemorrhage. A deficiency of this vitamin also causes liver damage and degenerative changes in the spinal cord. This may be responsible for the slightly abnormal gait shown by chicks suffering from dermatosis. In adult fowls pantothenic acid deficiency does not result in dermatosis, but is manifested by poor hatchability and high embryonic mortality.

Although a dermatosis has been observed in commercial flocks of chicks which

is indistinguishable in many respects from that resulting from pantothenic acid deficiency, it has not been possible up to the present time to show that it is of nutritional origin. When chicks are fed a ration containing a considerable quantity of dried raw egg white, they develop a dermatosis



White Leghorn chick showing the preliminary phase of riboflavin deficiency.



White Leghorn chick showing the dermatosis resulting from pantothenic acid deficiency.

which is also indistinguishable from that resulting from pantothenic acid deficiency. Recently it has been reported that chicks fed a special simplified ration containing a large amount of pantothenic acid develop a

severe dermatosis similar to that observed in pantothenic acid deficiency. In view of these results, field dermatosis should not be diagnosed for the time being as pantothenic acid deficiency.

#### NUTRITIONAL DEFICIENCY DISEASES CAUSED BY A LACK OF MINERALS

The nutritional deficiency disease resulting from a deficiency of manganese is usually called perosis, but when the disease first became a field problem it was called slipped tendon or hock disease by most people. Perosis is not an uncomplicated nutri-



Rhode Island Red pullet afflicted with the slipped-tendon phase of perosis.

tional deficiency disease, but is similar to rickets or pellagra in that several essential nutritive substances are required to prevent its development. It has recently been found that an organic factor which has been reported by one investigator to be choline is necessary for the prevention of perosis as well as manganese.

Perosis is a malformation of the bones of chicks. The symptoms usually observed are swelling and flattening of the hock joint with slipping of the Achilles tendon from its condyles. The tibia and the tarso-metatarsus are bent near the hock joint and rotated laterally. One or both legs may be affected. A deficiency of manganese also causes a shortening and thickening of the long bones of the legs and wings. The severity of perosis is aggravated by the presence of large amounts of calcium and phosphorus in the ration. In mature fowls manganese is also essential for the maintenance of egg production, egg-shell strength and hatchability.

Goiter in chickens in iodine-deficient areas has been reported, but it was not produced experimentally until about two years ago. In extreme cases of experimental goiter thyroid glands have been observed which were approximately 20 times normal weight. Histologic examinations of the enlarged thyroid glands show an absence of colloid and a hyperplasia of the living cells of the follicles. These changes were apparent at 6 weeks and increased in severity with age.

#### THE NUTRITIONAL DEFICIENCY DISEASES OF PRACTICAL IMPORTANCE

Of the nutritional deficiency diseases just discussed, only vitamin A deficiency, vitamin D deficiency, vitamin G deficiency and manganese deficiency appear to be of any great practical importance. Except in the case of these deficiency diseases it is ordinarily unnecessary to resort to the use of special vitamin carriers in order to make poultry rations nutritionally adequate. Vitamin B, vitamin B<sub>6</sub>, pantothenic acid and vitamin K appear to be more than adequately taken care of by the cheaper, more common feedstuffs, and vitamin E by making sure that these feedstuffs are as fresh as can be obtained. Although it is not always possible at present to prevent completely the development of gizzard erosions, the use of liberal quantities of wheat by-products, ground oats and alfalfa meal will give a ration that will be reasonably protective.

The nutritional deficiencies of practical importance must be taken care of by resorting to special feedstuffs which are in general somewhat high-priced. This has resulted in the determination of the quantitative requirement for vitamin A, vitamin D, vitamin G and manganese and of the amount of these nutritive essentials in poultry feedstuffs. As a consequence, high-carotene alfalfa meal has been developed within the past few years which together with fish oil has made it possible to satisfy the need of chickens for this vitamin in a satisfactory manner. The same is true for vitamin D, which is supplied in general by biologically assayed fish oil, and for vitamin

G, which is supplied in large part by milk by-products, alfalfa meal, dried yeast, liver meal and by-products of the fermentation and distilling industries. The vitamin content of these products can be readily determined either by chemical or microbiologic procedures. The manganese requirement is usually satisfied by the inclusion of small amounts of technical manganese sulfate in the ration at a cost which need not be greater than 2 cents per ton.

#### NUTRITIONAL DEFICIENCY WITHOUT CHARACTERISTIC SYMPTOMS

Not all nutritional deficiency in chickens is made evident by the development of characteristic symptoms. Such nonspecific symptoms as retarded growth, uneven development and rough feathering in chicks and lowered egg production, hatchability failure and loss of weight in hens, in spite of the absence of any well-defined pathology, are often evidence of the presence of inadequate nutrition.

It is desirable, therefore, for veterinarians who attempt to diagnose ailments in poultry flocks and give service to poultrymen to possess a considerable knowledge of fundamental poultry nutrition, as well as knowledge and experience in the field of poultry disease. This should include not only a knowledge of the quantitative requirements for essential nutritive substances, where this information is available, but also a knowledge of the compounding of good poultry rations and correct feeding management. Otherwise it is impossible to determine from the character of the ration and of the feeding management what recommendations should be made to overcome nutritional difficulties resulting in the development of nonspecific symptoms.

It is easy enough to diagnose the nutritional deficiency diseases of poultry because they have characteristic symptoms. It is a much harder task to diagnose accurately difficulties in poultry flocks for which no characteristic symptoms either of a nutritional or infectious nature can be found. It requires the careful correlation of all the information which can be obtained concerning the composition of the

ration, the feeding management and the nonspecific symptoms of nutritional deficiency found present. Veterinarians who obtain training and experience in poultry nutrition in addition to their training and experience in poultry diseases can provide a type of service which poultrymen greatly need and for which, in the opinion of the author, they will be glad to make adequate return.

#### Cold Brooding

Chicks should not be provided with artificial heat after they are 3 weeks old. To guard against too much of a shock when the chicks are deprived of heat entirely, heat is withdrawn a night or two before they are transferred to cold brooding from the colony brooder. Portable brooder boxes holding 80 chicks are used and the best results are obtained by placing the boxes on fresh ground every few days and providing runs of 6' x 12'. As fresh ground is invigorating, shifting the position of the boxes accomplishes that end.

Fatal crowding is prevented by using wire-netted floors of fine mesh two inches above the wooden floor of the brooder box. The ventilation beneath prevents the suffocations which occur when chicks crowd down on solid floors. The settling of moisture on the inside of the box and on the bodies of the chicks calls for additional ventilation.

The standard brooder box is divided into two sections, one for sleeping quarters and the other for a small scratching pen needed when the weather or cold mornings prevent turning the chick into the run. The scratching section is equipped for feeding and drinking. This method of brooding chicks is definitely recommended and practiced at the Parafield Poultry Experiment Station. [*Excerpt from an article entitled "Hot Brooding, Cold Brooding, Feeding and Ailments of Chickens" by M. W. Aird, poultry adviser, Parafield Poultry Experiment Station. The Journal of the Department of Agriculture of South Australia, xlv (Sept. 1940), pp 71-74.*]



## Swine Practice\*

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A LARGE part of the work of a veterinarian in the Cornbelt is swine practice. Its problems extend from the time the sows are bred until their offspring go to market. The practitioner owes his clients the benefits of the latest developments of medical research. Nutrition, diet and parasitism are becoming more important in swine raising. To be more helpful to the hog raiser, a knowledge of feeds, vitamins and mineral elements is as necessary as knowledge of diseases.

In this paper, I shall attempt to relate only certain common conditions encountered in my own practice and those of my colleagues.

### BROOD SOWS

The first requisite in raising hogs is selecting the right type and kind of breeding stock. The next step is a correct ration for the sow, even before breeding, if she is to raise healthy litters and remain healthy herself.

A great many swine raisers need the veterinarian's advice on proper feeding. While progress has been made as to protein requirements, there is still room for improvement in the quality and quantity of protein, when hog prices are low. Vitamins and mineral elements are often lacking, but these can be supplied at a reasonable cost. Failure to feed legume hay to hogs not on pasture is a common error. These deficiencies are often seen early in the nursing period.

Experimental feeding by Doyle of the Indiana Experiment Station showed that the ration during gestation greatly influenced the death rate in new-born. When sows were fed a good quality of protein throughout gestation, the average death loss was 11 per cent, but when only grain

and minerals were fed, the death loss was 44 per cent during the first week. Improper housing and feeding after farrowing account for further losses.

### PIG SCOURS

The sow's ration should be reduced from a day or two before to a week or ten days after farrowing and increased gradually. Heavy feeding, wet weather, and damp insanitary quarters increase the amount of pig scours.

*Treatment:* Reducing the sow's ration and adding sodium bicarbonate to the feed or drinking water will check mild cases caused by dietary errors. Copper and iron sulfate in the slop or feed for a few feeds works well. One-half pound of copper sulfate or 4 ounces each of copper and iron sulfate is dissolved in a gallon of water with caramel to color. One pint in 20 gallons of slop or one-half ounce per sow is given. This is a nice product when dispensed. Formalin is generally effective also, in 2- to 4-dram doses. For severe cases, due to the colon typhoid group of organisms, enteritis mixed bacterin is indicated.

### PIG ANEMIA

Anemia causes heavy losses in baby pigs, especially those raised early in the season (February and March, or later). When the weather is bad and the pens muddy, owners usually keep them up on floors indoors away from soil and sunlight. It may occur also in pigs that have access to soil, and the "McLean-raised" pigs. Some soils are deficient in copper and iron, and cobalt, which is necessary for their utilization, may be lacking.

You are all familiar with the characteristic edema, thumps, pneumonia, and the heavy death loss of severe anemia. A Tallquist hemaglobinometer is of value in mak-

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ing a diagnosis of anemia. It should be in every veterinarian's equipment.

To prevent anemia in baby pigs, copper and iron sulfate are added to clean black dirt and placed in the pens daily from the first day. One can render a real service by calling attention to this simple procedure. Painting the sow's udder is messy, insanitary and a waste of time. In very anemic herds, I have had the best results from individual dosing with 5 grains daily of reduced iron for 4 or 5 days.

#### VACCINATION

A large part of swine practice consists of immunizing hogs against cholera. There is considerable controversy over the proper age for immunization. The past few years, the tendency has been to vaccinate pigs at an earlier age. I prefer them 5 to 8 weeks old and try to avoid vaccinating any under 4 weeks. There are conditions that make it necessary to do so, but in these events the owner should be told that the pigs may not be permanently immunized. Mark such pigs for identification and advise sending them to market early. I always increase the dose of virus on these pigs to 4 or 5 cc. Regardless of age we should be as sure as possible that the herd is in condition to immunize. Examine the herd carefully before starting. Failure to do so may lead to serious trouble later. Question the owner and do not be misled by his statements. Some owners are not very observing. During the busy vaccinating season, we are rushed to take care of many clients who want their hogs immunized right off and nearly always early in the morning. In one's haste to take care of all one is liable to get careless in examining herds and vaccinate pigs that are not in condition to stand vaccinating. Some of the more common contraindications are pig anemia, latent infections, pulmonary disease, enteritis, pox and parasites. It is far better to lose the vaccination of a herd than, through haste and carelessness, run into trouble a few days later. It has not paid me or the owner to vaccinate unthrifty hogs. There is nothing that will get one into more trouble, except low serum dosage in such herds. Wherever practical

and possible, each herd should be looked over a day or two before and again on the day of treatment.

If we desire to increase the number of hogs immunized by veterinarians our results must be better than those of the farmer who vaccinates his own. This can best be accomplished by careful examination of the herd for acute and latent infections, faulty diet, parasitism, etc., before starting treatment and not vaccinate until harmful conditions are corrected. Then give ample doses of serum. I always exceed the label dose of serum and give pigs of 35 to 40 pounds about 1 cc. per pound. I find that most clients do not object to a large dose of serum if the reasons are explained. We have all seen severe reactions in apparently healthy herds which demonstrated the necessity of giving liberal doses of serum.

*Virus:* Since virus is not stable it should be protected against heat and light, especially direct sunlight. When working in the field, a portable refrigerator should be a part of the outfit. We should never forget that the virus is what produces the lasting immunity. Never give less than the label dose and it is much better to give more.

When trouble develops the first two weeks after vaccination, if plenty of serum was given, one can look for some other cause of the trouble. I have never seen a serum break. The trouble in most instances is yard infections which include the various forms of enteritis, pulmonary infections, parasites, etc., present at the time of vaccination. When these intestinal and lung infections become septicemic they are difficult to distinguish from cholera. Here, a laboratory examination gives valuable assistance.

When vaccinating herds sick with cholera, the owner should be warned of a loss and told that it is useless to vaccinate hogs with visible symptoms of cholera, as the double treatment is primarily preventive, not curative. It requires a great deal of time to take the temperature of each hog in a large herd to determine how many are sick. Satisfactory results are usually obtained by feeding the hogs and calling them out. All

hogs that will come out, eat, and remain out eating grain for 10 or 15 minutes, are usually good risks for vaccination. This method saves considerable time. Serum dosage in herds sick with cholera should be increased 50 to 100 per cent. I always use virus in sick herds as experience has shown me that results are better when virus is used. It saves the cost of the re-treating that is necessary when serum alone is used.

#### ENTERITIS

The various forms of intestinal diseases cause more trouble than any other hog disease. The death loss from enteritis is exceeded only by cholera, if at all, and the economic loss is much greater.

The types most often encountered are on the one hand, what have been called necrotic enteritis, swine typhus, "necro," etc., and on the other hand, hemorrhagic dysentery or bloody diarrhea. The two types of enteritis are very different in clinical symptoms. Formerly these diseases have been regarded as bacterial and associated with insanitary conditions. Davis, Freeman and Madison of the Michigan station report six experiments indicating that necrotic enteritis develops primarily from nutritional deficiency. Their results show that the disease, infectious necrotic enteritis, is a secondary complication caused by the invasion of the intestinal tract by the organism *Salmonella choleraesuis* and other microorganisms. They fed liver, yeast and particularly nicotinic acid with remarkable results. This may explain the development of necrotic enteritis in pigs on some farms under the "McLean County" plan.

I have used nicotinic acid on a few herds with the following results in two of them:

*Herd No. 1:* There were 76 pigs in this herd weighing about 50 pounds; four died before the herd was examined. They were fall pigs in a dry yard on a ration of shelled corn, mineralized tankage and salt, in self-feeders: hair rough, many pigs thin, emaciated, and marked dermatitis, especially over the shoulders, neck and ears. In the two autopsied, the intestinal tract showed the usual lesions of necrotic enteritis. Results: Two pigs died on the second day of the treatment. At the end of a week, two more that looked unprofitable to keep were killed. The remaining 66 made marked improvement. Scouring had ceased

in about six days and recovery was complete at the end of the treatment.

*Herd No. 2:* A herd of 80 feeder pigs of about 100 pounds were purchased from a serum company in April of 1940. These were test pigs. They were put in the feed yard following feeder cattle upon their arrival on the farm about three weeks later. No other hogs had been on the farm for four months. At the time, the owner had removed 22 scouring pigs from the lot. The pigs died a day or so before. These pigs were passing liquid feces streaked with blood. A diagnosis of hemorrhagic dysentery was made. This herd of pigs had been placed on ground barley slop with alkaline solution four days before my visit. The 54 apparently normal pigs were moved into a clean field on high ground in a yard which was moved to clean ground every couple of days. They were divided into two lots of 27 pigs each. One lot continued to receive alkaline treatment. The other received 100 mg. nicotinic acid daily. One pig from each group developed enteritis with scours in a couple of days, and were removed to the sick group which had now been divided into two lots of eleven each in movable pens on clean ground. One group of the sick pigs was given alkaline solution, the other 100 mg. each daily of nicotinic acid. Results: One pig died in each lot. The remainder recovered and were fed out. No conclusions can be drawn from this case, as all pigs received alkaline solution before starting a part of the group on nicotinic acid, except that the group receiving nicotinic acid apparently did no better than the other group.

#### SWINE DYSENTERY

In Iowa this disease appears to be increasing. The past year it has constituted the majority of cases of enteritis I was called upon to handle. Dysentery affects all ages, though young pigs have less resistance to the disease than older hogs, although there are herds in which the disease kills sows in two or three days. The mortality depends on the virulence of the infection and the animal's resistance. It seems to spread through the contamination of feed by the sick hogs. The causative organism is present in the bowel discharges of affected animals. It does not spread to other farms except through the transfer of exposed and infected hogs. The period of incubation appears to be about a week in the field cases.

*Symptoms:* In acute dysentery often the first evidence of any trouble is when the



owner finds a dead animal or two. Closer observation finds more animals "slow" or off feed. The temperature is usually high, generally around 104° to 106° F. Diarrhea is present or soon develops. Occasionally, hogs die without symptoms of diarrhea. The feces contains mucus and blood. In severe acute cases, animals rapidly become gaunt, weak and show great prostration. The blood in the feces of young hogs is generally more easily recognized as such. In older animals the feces appear darker or chocolate colored.

**Autopsy:** In the early stages the cecum and colon show congestion and thickening of the walls, also congestion of the mesenteric lymphatic glands. Often blood is present in the lumen of the intestine with an increase in the amount of mucus. In later stages, there may be necrotic and diphtheritic membranes with sloughing of patches passed in the feces with streaks of blood.

**Control:** For the control of dysentery emphasis is placed on sanitation. During winter months, this is quite a problem, due to freezing weather, lack of sunshine and muddy yards that are crowded with livestock. All apparently well hogs are removed to clean ground. If a concrete floor is available, so much the better, since this can be flushed and cleaned and thus help to control the intake of infection. Feed and water utensils are cleaned at least daily. The infected feed yards are abandoned for a year or more. Newly purchased pigs, if not from a herd known to be clean, are isolated from other hogs for at least two weeks. This practice is often neglected.

**Treatment:** In past years, I have tried all kinds of medicinal treatment with but little success. This past summer, J. S. Koen suggested sodium chloride. To date, I have used it on a number of herds with good results, except in one case.

Remove hogs from behind cattle; isolate the sick, and place apparently well hogs on clean ground or concrete floors. Administer one gallon measure of salt in 50 gallons of buttermilk, add ground oats or barley to make it more palatable. Feed four days,

skip two days and repeat. Mix the salt with charcoal and anise to disguise and flavor.

**Herd No. 1:** This herd of hogs was examined on June 17. They were on a blue grass pasture that was supposed to be clean ground. A half dozen pigs were passing liquid feces containing mucus and blood. Diagnosis: dysentery. The herd was receiving whole shelled corn, ground oats, tankage, beanmeal, salt and mineral.

The herd was put on an alkaline mixture in whole oats soaked morning and night with buttermilk at noon. The owner reported after a week the pigs were doing fine, then reported again two days later that more pigs were coming down with scours. We continued the same treatment until July 8, or two weeks later. I then held autopsies on two pigs and diagnose dysentery. Although the loss had been small, more pigs were scouring and the general appearance of the herd was not good. Treatment was continued with alkaline mixture and tannic acid was added. They were removed from pasture and placed on a cement feed floor. One week later, the owner brought in two more pigs for autopsy; the diagnosis was the same. This was three weeks after the start of the treatment. The herd at this time was placed on buttermilk, ground oats and salt: one gallon measure of salt in 50 gallons of buttermilk. This was fed four days, skipped two days and then fed four more days. At this time, all pigs had apparently recovered. One week later, the herd was given santolin capsules, and two weeks later, vaccinated with serum and virus with no trouble.

**Herd No. 2:** In June 1940, I was called to see a sick herd running in old feed yards and out into a blue grass pasture. This farm has had trouble with dysentery for years. There were 130 pigs of 20 to 30 pounds, and 25 sows in the herd. A large number were scouring and several already dead. Two pigs and one sow were autopsied. The sows were sent to market and the well pigs were sorted and removed to other quarters. Alkaline treatment with tannic acid was administered. About 30 pigs were saved. About three weeks later on this farm a second herd of 160 were on clean ground in an adjoining field, but the drainage from the infected pasture ran across a corner of the field. A number of these pigs began to show symptoms of dysentery. The herd was placed on buttermilk, ground barley and salt. Salt was fed four days, skipped two and again fed four days. In ten days, this herd had recovered with a loss of very few pigs. Following a storm on November 11, the owner was compelled to remove these hogs to the house and the disease reappeared. Salt treatment was again given with a loss of two.

*Herd No. 3:* In November 1940, a client reported that his pigs were developing what he thought was dysentery. He lived on a farm on which outbreaks of bloody enteritis had occurred. He was quite concerned over his heavy losses from this disease in the past. I dispensed salt mixed with charcoal and anise but as usual told him to take away all grain except ground oats, barley and buttermilk. The salt was to be added at the rate of one quart in 15 gallons of buttermilk to be fed morning and evening. He fed it three times a day. After the 4th feeding, he called and declared in a very excited voice: "These pigs are all sick. A lot have died and it seems they are all going to die. I think they are poisoned." I found the farmer's diagnosis was correct. There were 56 pigs in the herd at the start of treatment. When I arrived at the farm, three were dead and nine others very sick, a few frothing at the mouth and having convulsions with all appearances of acute salt poisoning. Three or four were very weak with little use of the hind quarters and blind. I immediately gave 40 cc. of calcium gluconate intraperitoneally. In all, nine pigs died and three recovered. The autopsy showed gastritis and edema of the mucous membrane and enteritis. There were no lesions of hemorrhagic dysentery as the owner expected. It later developed that the hired man who fed the pigs had given them a large feed of tankage after they had been without it for several days. Inquiry also revealed that these pigs had not been fed salt before the time treatment. He had reported two or three sick the previous night after feeding but nevertheless fed them again in the morning and made more of them sicken. When the salt treatment was discontinued the trouble ended.

I have used salt in 20 other herds with good results and no evidence of poisoning. When I first started using this treatment, I was afraid of the result, and after using it on several herds, I began to wonder just how much it took to produce salt poisoning. Frohner gives the fatal dose as one-half to one pound. It appears that hogs get a tolerance to salt if it is fed regularly and can consume large amounts with no visible damage. I have seen hogs poisoned on both dry salt and brine. The history in these herds always indicated they had been without salt for a time and then allowed to overeat. Ample water supply is imperative.

#### ERYSIPELAS

Swine erysipelas is increasing at an alarming rate in many sections of the country. This is especially true in the Cornbelt. Here, a great interchange of feeder hogs occurs. Many truckers show little

regard for state regulations. A great many hogs are boot-legged in. A major factor is the community sale barn and yards at which feeder pigs are sold.

Our Iowa sales-barn regulations prohibit the sale of big jointed pigs, except for immediate slaughter. This is to be commended, for according to a report of Grey, Osteen and Schoening 357 or 75.6 per cent of 472 arthritic joints of swine showed the erysipelas organism on culture. These specimens originated in 91 counties in 41 states.

*Cause:* Erysipelas is caused by a specific microorganism. According to research workers, it is difficult to reproduce the disease in swine by artificial inoculation. How the disease is transmitted from one animal to another in the field is still a mystery, but probably it is mainly by contaminated feed and water from the sick hog. Apparently healthy hogs may be carriers of the infection. Field observations tend to confirm this. I observed an outbreak of acute erysipelas on a farm where no new hogs except a boar had been introduced for two years. There had not been a previous outbreak on this farm.

According to a government report, the organism can survive in the soil for at least a year and under favorable conditions multiplies in soil. It resists putrefaction, desiccation and sunlight. In meat it is not destroyed by pickling, smoking or drying. To destroy the organism by cooking required two and one-half hours for a piece of meat six inches thick.

*Symptoms:* The symptoms depend on the stage of the disease, whether it is acute, subacute or chronic. Often, all types exist in an infected herd, depending on the duration of the attack, the virulence of the organism, and the animal's resistance.

In acute erysipelas, the onset is sudden and the temperature high. Prostration is not so marked as in hog cholera except in occasional peracute cases. The back is arched and gait stiff, the skin scarlet red and in the early stage blanches on pressure. Later, the congestion of the skin is darker and the blanching not so evident. Often there is vomiting and constipation. A dis-

charge from the eyes is sometimes present as in cholera, although not as constant.

The subacute cases follow the acute attacks. The symptoms are stiffness, stilted gait, enlarged joints, swollen legs, lameness, unthriftiness, and often the starting of sloughing of the skin. One sees many herds in this stage.

The chronic form is characterized by stiffness, enlarged joints, unthrifty condition, sloughing of the skin. The tail and ears often slough off.

**Diagnosis:** The diagnosis of erysipelas and hog cholera should not be confusing, for with the case history, visible symptoms and a couple of pigs to autopsy, the diseases are distinguishable. I know of no other disease except erysipelas that produces an arched back, a stilted gait, lame, swollen legs, big joints and skin lesions.

Erysipelas serum when administered early has diagnostic value also. The earlier used, the better. Often dramatic cures are effected from within 24 to 48 hours. On one farm where erysipelas has shown up annually in sows immediately after farrowing, we injected sows at the first symptoms of the disease and have had them normal and nursing pigs in 24 to 36 hours. A laboratory diagnosis should be obtained when possible. Always remember that even though the laboratory findings are negative, erysipelas may be present. The positive findings are conclusive. The organism seems to be more easily recovered in acute cases.

**Treatment:** There can be no rule laid down for handling all cases of erysipelas. Many cases present different problems. From a scientific viewpoint, erysipelas serum is always indicated in sick herds, but from an economic view, its use is not always justified. Two points we should always remember are:

First: Hog cholera and swine erysipelas may be present in a herd at the same time. When this occurs hog cholera serum and virus should be administered to the herd, and erysipelas serum is also indicated for the sick hogs. Some veterinarians believe that hog cholera serum is effective in controlling an outbreak of erysipelas. I have

used it on a number of hogs sick with erysipelas and the results were generally disappointing.

Second: In any sick herd of hogs that have not been immunized, hog cholera is the disease that must not be overlooked or mistaken for erysipelas, as dire results will follow. If a herd is not immune, use anti-hog cholera serum and virus.

It is frequently difficult to give a prognosis. Only a few pigs may sicken and the disease die out, or again, it may become acute and spread rapidly. In a great many outbreaks the disease is mild, dies out after a few cases appear, assumes a mild form, and then becomes subacute and chronic with many cases of arthritis but no death loss. In many of these cases, treatment of the pigs as they sicken every two or three days is satisfactory. If the disease in a herd is in the subacute or chronic stage, I do not think the administration of serum is economical.

When erysipelas appears in the acute form and spreads rapidly, erysipelas serum should be administered to the whole herd. The sick animals should not be isolated but allowed to mingle with the herd. This provides exposure for the other hogs. It may produce a longer immunity than serum. If new cases develop after ten days to two weeks, these individuals may be re-treated or, if many sicken, the herd may have to be re-treated with serum to reestablish the passive immunity in those that did not acquire the infection from the sick hogs. A second dose of serum is, however, very seldom necessary.

**Culture Immunization:** For the past couple of years in infected areas in Nebraska, qualified veterinarians have been using virulent cultures of the erysipelas organism (obtained from a BAI laboratory) and erysipelas serum to establish a more lasting immunity. The results are said to be quite favorable.

Qualified veterinarians are now permitted to use the culture in Iowa in conjunction with serum. It is used only on well hogs and on farms where infection is known to exist. Its use is supervised by the state



veterinarian. The dosage recommended is as follows:

|                         |                      |
|-------------------------|----------------------|
| Pigs up to 50 lbs.....  | { 1/4 cc. of culture |
|                         | { 5 cc. of serum     |
| Pigs 50 to 100 lbs....  | { 1/2 cc. of culture |
|                         | { 10 cc. of serum    |
| Pigs 100 to 150 lbs.... | { 3/4 cc. of culture |
|                         | { 15 cc. of serum    |
| Hogs 150 lbs. and up,   | { 1 cc. of culture   |
| any size .....          | { 20 cc. of serum    |

In 10 to 14 days, the dose of culture is repeated alone, using double the amount of the first injection. The prescribed dose of serum must not be increased when used with the culture. As little serum as possible is used; just the reverse to hog cholera immunization. It is used as early as possible; the earlier the better, if only a few hours after the pigs are farrowed. The product may be used on pregnant sows. Rubber gloves should be worn to avoid self-infection.

I sincerely hope this is the answer to the erysipelas problem and that its use will be confined to qualified veterinarians. Too much death-dealing virus has already been scattered about this country by incompetent users of deadly viruses.

### Sulfapyridine Intramuscularly

Deep intramuscular injection of sodium sulfapyridine is a safe alternative to intravenous injection of the drug. A 33 1/3 per cent solution in sterile water is used. In this way a blood level of 3 to 10 mg. per cubic centimeter was promptly obtained, and gastrointestinal irritation and nausea were avoided. From 6 to 10 cc. of the solution was given as the first injection and this was followed with 3 cc. every four hours until the temperature was normal for 24 hours. Thereafter the dose was reduced one half and continued for five to six days. This method of administration was used in pneumonia, pyelitis, brucellosis, appendicitis, peritonitis, typhoid, abscesses and other infections. The results were equivalent to those obtained from oral administration. [L. H. Hall, C. E. Thompson and R. J. Wyrens. *Nebraska State Medical Journal*, xxv (Nov. 1940), p. 398. Abst., J.A.M.A., December 28, 1940.]

### Lymph Nodes in the Mechanism of Immunity

When a 5-cc. dose of virulent *Clostridium chauvei* cultures was injected directly into the structure of the prescapular lymph nodes of cows, neither local nor general reaction was provoked, but when the same doses were injected into the facial muscles, both local and hyperthermic reactions occurred. This experiment established the rôle of the lymph nodes as microbicides—as instruments in the mechanism of immunity. — *From Annales de Médecine Vétérinaire.*

### Sulfanilamide and the Diet

Controlled tests made by the U. S. Public Health Service on rats showed that the mortality rate and the incidence of anemia from orally administered sulfanilamide were increased in the animals receiving a low protein diet (7 per cent) as compared with similarly treated rats kept on a diet containing 30 per cent protein. The value of liberal allowances of protein (30 per cent) in preventing excessive blood destruction from prolonged treatment with sulfanilamide seems to have been established by these experiments. [Smith, Lillie and Stohlman, *Public Health Reports*, lvi (Jan. 1941), p. 24.]

The virus of Carré multiplies in the epithelial cells of the mucous membranes lining the entrances and the exits of the host's body (nose, mouth, urethra, rectum) and therefrom canine distemper spreads to new susceptible hosts.

Although cheilosis *per se* is not a clinical entity in animals, its relation to riboflavin deficiency in children indicates the character of tissular lesions ariboflavinosis is capable of producing. Besides cheilosis, vitamin B depletion affects the eyes (dim vision, photophobia, keratitis).

# The Occurrence of Swine Erysipelas in the Human Family\*

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THE BACILLUS of swine erysipelas, *Erysipelothrix rhusiopathiae*, is now known to be the cause of an erysipelas-like skin disease in the human family. This infection in man was first described by Rosenbach<sup>1</sup> in 1884. He designated it as erysipeloid.

## ORGANISM OF SWINE ERYSIPELAS

Morphologically the organism appears either coccoid in shape or as straight or slightly curved rods. Its wide dissemination is extraordinary. Its habitat is wherever nitrogenous substances are decomposing, and under certain conditions it exists in the soil as a saprophyte. Although swine are infected more frequently than other animals, the organism has been demonstrated in diseased cattle, sheep and birds. Several German investigators have reported that a large percentage of all swine are carriers of the organism without showing symptoms of the infection.

Three strains of the bacillus are generally recognized: human, swine and mouse. The virulence of these strains has been modified through prolonged passage in their respective hosts. Klauder<sup>2</sup> has shown that the virulence of the swine strain can be modified by passage through animals and also through culture. In the human and swine infection, the organism has an affinity for the skin. It is fortunate that man is relatively immune through the gastrointestinal tract because the organism manifests considerable resistance towards harmful influences. According to Van Es and McGrath,<sup>3</sup> its virulence is but slowly

destroyed by salting and pickling. Only after 26 days did the virulence of pure cultures disappear in strong brine. Salting hams with common salt and saltpeter has failed to destroy virulence after 30 days of exposure. The organism was still virulent in well-smoked hams three months later (Nocard and Leclainche<sup>4</sup>). Pieces of meat 6 in. thick required 2½ hours of cooking before the heat had sufficiently penetrated to bring about complete sterilization (Glässer<sup>5</sup>), and roasting for the same length of time does not always kill the germs (Von Preisz<sup>6</sup>).

## THREE FORMS OF ERYSIPELAS IN SWINE; PROTOTYPES IN MAN

Three forms of this infection are found in swine: (1) a mild form of urticaria (diamond skin disease), characterized by slight constitutional symptoms and the presence of sharply circumscribed, quadrangular spots on the skin—hence the term “diamond”; (2) a severe form, septicemic in character with the presence of diffuse erythema; and (3) a chronic form, chronic erysipelas and endocarditis, occurring in animals that have recovered from the acute infection, and characterized particularly by polyarthritis and symptoms referable to what is a distinctive pathologic finding, i.e., a vegetating type of endocarditis.

A prototype of these three forms is found in man. The skin form of erysipeloid in the human family is comparable with the diamond skin disease in swine. It is by far the most common type and will be described later. The septicemic form, more commonly observed in swine and responsible for the larger part of the mortality and economic loss caused by the disease, is rare

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†Plant physician, F. G. Vogt & Sons.

<sup>1</sup>Rosenbach, F. J.: Experimentelle morphologische und klinische Studien der Erreger des Schweinerotlaufs, Erysipeloid und Mäusesepitämie. Zeit. f. Hyg. u. Infekt., lxxiii (1909), pp. 343-371.

<sup>2</sup>Klauder, J. V.: Erysipeloid as an occupational disease. J.A.M.A., cxi (Oct. 8, 1938), pp. 1345-1348.

<sup>3</sup>Van Es, L., and McGrath, C. B.: Nebraska Agr. Exp. Sta., Res. Bul. 84 (Aug. 1936).

<sup>4</sup>Nocard and Leclainche: Les Maladies microbiennes des Animaux (T. I., Paris, 1903).

<sup>5</sup>Glässer: Die Krankheiten des Schweines (Hanover, 1927).

<sup>6</sup>Von Preisz: Kolle u. Wassermann's Handb., vi (1929), p. 449.

in man. German writers have reported cases occurring in veterinarians accidentally inoculated through a prick of a needle when immunizing swine against the infection, with the serum of swine and a small quantity of virulent culture. In this country, however, no cases of the acute septicemic form are known to have been reported. The third form, characterized by chronicity and polyarthritis, is likewise rare in man. Klauder<sup>7</sup> has observed one case.

#### LOCAL SYMPTOMATOLOGY

The cases of the urticarial form of erysipeloid observed in man almost invariably are preceded by some demonstrable break in the skin which served as a portal of entry for the organism. Because the hands are naturally more susceptible to trauma than other parts of the body, the infection commonly appears there first. It is usually easy to trace the infection to physical contact with its probable source, such as handling pork products or salt water fish. The slime on the fish may harbor the organism living there as a saprophyte from sewage. Or there may be a history of handling dead matter of plant and animal origin, or matter derived from animals, such as hides, pelts, bone and manure.

The first symptom usually is pain at the site of inoculation following an incubation period of 24 hours to three days. Erythema is present along with the pain, and frequently moderate swelling develops. The two most valuable diagnostic signs, usually present a day or two after the lesion is first noticed, are the murky, purplish red shade of the erythema, and pain of the part out of proportion to its appearance, especially when near a joint. At first glance many of these cases look like an ordinary pyogenic infection or an early cellulitis, but there is no pitting and no suppuration. The infection proceeds characteristically to show migratory tendencies—so much so, in fact, that even when a case is seen compar-

atively soon after probable inoculation, as in the medical department of an abattoir, the area of erythema may have advanced well beyond the puncture wound or scratch while the skin immediately surrounding this lesion has faded to normal. The advancing border of erythema usually spreads by continuity, but many cases show the purplish red patches developing at points several inches removed from the original area of infection. Except in severe cases, however, it seldom extends above the wrist.

#### OCCASIONAL SYMPTOMATOLOGY

In an analysis of 100 cases of erysipeloid by Klauder,<sup>2</sup> lymphangitis and adenitis were present in 21. These symptoms appear early and disappear before the involved skin becomes normal. In seven additional cases enlargement and tenderness of the regional lymph nodes were noted in the absence of lymphangitis. Some of the patients say they feel ill and feverish the first days of the infection. Temperatures ranging from 100° to 102° F. have been noted. Two cases exhibited chills and vomiting.

Stiffness of the joint of an involved finger is often present beyond the tenseness due to simple swelling because the stiffness persists after the swelling disappears. In ten of the 100 cases in the series, the arthritic symptoms persisted after the skin became normal. One or a few hemorrhagic vesicles appeared on the skin at the site of erysipeloid in seven cases.

#### DURATION OF THE INFECTION

From onset to complete recovery the duration of the infection is in the majority of cases about three weeks. Relapses are not uncommon and immunity to the disease apparently is not acquired since second attacks have occurred. Lost time may arise because the infected part hurts too much to continue work or because the progress of the infection is so rapid as to suggest unusual virulency and consequent need for intensive treatment off the job. About one fourth of the cases lose time ranging from one day to two weeks.

<sup>7</sup>Klauder, J. V.: Erysipeloid; bacillus of swine erysipelas infection—a disease of industry. *J. Ind. Hyg.*, xiv (June 1930).



## GENERAL INCIDENCE

In 1926, Klauder, Righter, and Harkins<sup>8</sup> conducted clinical and laboratory studies of erysipeloid among fish handlers. One of them observed about 1,000 cases among commercial fisherman in fish pounds along the northern New Jersey coast, particularly in the vicinity of Seaside Park. The disease commonly appeared on the hands at the site of trauma usually incident to the bite of a fish, or the prick from the scales, spines, or fin of the fish. Infection of fish with the bacillus of swine erysipelas is unknown to the United States bureau of fisheries, but, as mentioned above, the organism is a saprophyte, particularly on the slime of fish and refuse thrown into the water. In the fishing industry the disease is known simply as "fish poisoning," while the employes of an abattoir speak of it as "hog poisoning." In both industries the disease is more prevalent during the summer months, possibly because the organism is known to grow best at 68° F.

In Klauder's<sup>2</sup> series of 100 cases reported in 1938, most of which were seen in private practice, 58 worked in pork-packing plants. Eleven were retail fish handlers, seven cases arose from handling tallow, grease or fertilizer, six were veterinary students who became infected while dissecting a horse, three were retail butchers, three were pleasure fishermen, two were bakers handling lard, while among the last ten cases a careful history revealed that the infection in three of them was caused by handling an unfinished pelt, skinning a rabbit, and carrying an opossum with its tail wrapped around the fingers which had been injured.

Dr. George P. Lawson of Roanoke, Va., verbally (Klauder<sup>7</sup>) reported an outbreak of 210 cases of erysipeloid occurring in a bone-button factory in which the bones of cattle were used. The infection appeared at the site of a break in the skin and pursued a mild course. The bacillus of swine

erysipelas was isolated from the bone dust. In the fish-canning industry "bone pullers" have become infected, and in a chicken-canning establishment the occurrence of the infection has been mentioned.

## INCIDENCE OF ERYSIPELOID IN AN ABATTOIR

In the medical department of a pork-packing plant in Philadelphia employing an average of 550 persons, the author has observed the following incidence of erysipeloid: In 1933 there were 15 cases; 1934, 15 cases; 1935, 9; 1936, 8; 1937, 10; 1938, 7; 1939, 6; and during the first seven months of 1940, we saw only 2 cases of the infection. With the exception of the year 1937, the incidence curve has shown a consistent decline. It is questionable whether or not these figures can have any significance. Instead of decreasing, the incidence of exposure to possible infection has increased, due to an increase in the number of employes. Acquired immunity can be ruled out because of a large number of employes new to the industry and the positive evidence of second attacks of employes old to the industry. We would like to believe that these figures show a trend toward the lowered incidence in swine, but there are too many variable factors in swine erysipelas in the United States to draw any such conclusion.

The prevention of swine erysipelas in the human family primarily is dependent upon the prevention of the infection in the hog, and secondarily upon the prevention of the possible portals of entry for the organism in man. In addition to whatever steps may be taken along these two lines, sanitary measures with reference to the proper disposal of decaying matter must be considered. Regarding the prevention of the infection in swine, Van Es and McGrath<sup>3</sup> have pointed out in detail the prophylactic measures which need to be taken by the farmer and the distributor. The pork and fishing industries can decrease the incidence by decreasing the number of accidents—even minor breaks in the skin. The refuse disposal program apparently would be a problem of individual farm and community control.

<sup>8</sup>Klauder, J. V., Righter, L. L., and Harkins, M. J.: A distinctive and severe form of erysipeloid among fish handlers. *Arch. Dermat. & Syph.*, xiv (Dec. 1926), pp. 662-678.

### TREATMENT

The severity of the case obviously governs the intensity of treatment, but rest and heat are important. Many of the milder cases clear up by applying ichthammol on the affected part and bandaging it snugly to obtain partial immobilization while the patient continues to work. This is followed by advising two half-hour soakings in hot magnesium sulfate solution during the evening with a wet dressing of 12 per cent ichthammol in alcohol during the night. For the more persistent cases rest from work with the hand kept in a sling and greater frequency of the above regime must be instituted. For those cases manifesting still more marked virulency, erythema doses of ultraviolet rays with a water-cooled mercury quartz lamp has been effective. If the infection persists a month or more, the use of immune serum has been advocated, but in administering it the possibility of serum sickness must be kept in mind. Klauder<sup>2</sup> cites 48 cases treated with serum of which 18 had serum sickness. In mentioning various antiseptics and other agents that have been recommended, along with the therapy he personally favors, he concludes that it is indeed difficult to evaluate different methods of treatment, since in many cases erysipeloid apparently runs a self-limited course and splinting the hand may be the only treatment required.

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### An Historic Moment in Livestock Sanitation

The span of 23 years (1917-1940) goes into the world's history of livestock sanitation as a period when the most important agricultural country of this era eradicated bovine tuberculosis from its dominion, that is, down to the negligible percentage of one half of one per cent.

October 1940 marked the end of that task when the last two California counties were cleaned up. The names of John R. Mohler, who planned the campaign, and of J. A. Kiernan and A. E. Wight, who carried out the details in coöperation with the

state veterinarians, are written indelibly into a record the American people can never overestimate and the world of medical science will not soon forget.

The term "tuberculosis eradication" became so much a matter of course during this span of years that few have stopped to define its true meaning. Now, with the world at war, its successful termination is easily crowded from the headlines albeit its value is incomputable in terms of national economics and public health.

Abundance in animal production and improvement of public health are not trivial matters in preparing for the common defense.

Thousands upon thousands of milk cows in all stages of tuberculosis in the milk sheds of American cities was a situation the present generation can not now comprehend—it's just history, weird but easily forgotten.

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### Regulating Crops and Animal Production

The future prosperity of the veterinary profession depends a great deal upon adjusting agricultural production. As former Secretary Wallace stated in his last annual report, it is sheer waste of labor, of capital and of soil, to grow unneeded crops [and produce too many animals]. Because the markets of the Old World are closed and trading with New World countries only increases our own surpluses, agricultural adjustment is an intrinsic problem of the veterinary profession. The products of the farm throughout the Western Hemisphere are practically the same: wheat, corn, cotton, hogs, cattle, horses. Only coffee, rubber and tropical fruits among the major crops are not universally competitive. In avoiding surpluses by regulating production of major crops and seeking jointly markets in the Old World on an equitable basis seems to lie the salvation of farming on this side of the Atlantic, and incidentally the salvation of a going veterinary service.

## Some Observations in Feline Practice\*

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*Hammond, Ind.*

FELINE PRACTICE seems to be unpopular with many practitioners. One can not tell whether this is due to a dislike for cats or lack of experience with them. Those of us who are practicing small animal medicine should give this subject some thought. If I mention some of the pitfalls of this branch of practice and relate some of the embarrassing moments I have had, the effort may be worth while.

Feline practice is comparable to poultry practice in respect to the practitioner's interest. But a few years ago there was lack of interest also in poultry disease among practitioners. Today all hands scramble for enlightenment on that field. In England, I am informed, nearly every family has a cat. Under the present restriction on the owning of dogs, there is no doubt that veterinarians of the British Isles welcome feline practice. Judging from my own territory, the regulations governing the handling of dogs has already increased the number of cats.

Many veterinarians seem to have an erroneous impression of a cat's disposition. The idea that the cat is a biting, scratching creature is not true. If the cat's natural character is considered along with kindness, feline practice becomes a pleasant branch of small animal work. In regard to the income derived, it is greater in my territory than canine practice. Although I grant that one meets some peculiar clients in the practice of feline medicine, the same is true of the other branches of veterinary work.

The first requisite is to know the characteristics of the different breeds and to understand the cat in health. With few exceptions cats become attached to places rather than to persons. Being naturally

nervous they enter your office with trembling and fear that must first be allayed to avoid trouble in handling. When put upon examination they expect to be driven off just as if they had jumped upon the table at home. The cat objects to confinement and will continue to struggle if held tightly. The use of tongs, stocks, etc., should be avoided as much as possible.

Smooth-coated cats are much harder than the other breeds. There is also a difference in the long-haired breeds, in regard to their disposition and resistance to disease. The red and orange Persians are the most unruly of the domestic breeds. As to behavior I would classify cats on the following downward scale: reds, blacks, blues, silvers, chinchillas, and whites.

The eyes are important. Cat judges want red cats to have copper eyes, blacks cats, orange or copper, while the whites must have blue eyes, and creams, copper. Chinchillas and silvers must have emerald eyes and the Siamese blue ones with a definite Oriental slant. Cat breeders depend upon the prepotency of the dam for type and form and upon the sire for coat. In these respects I am merely quoting what the breeders say.

### BREEDING

There is more variation in the breeding schedule of cats than of dogs. To raise healthy cats they should not be bred until they are mature, that is one to two years old.

The duration of estrum is from one to ten days, and appears at intervals of three weeks to several months. The period of gestation is 60 to 63 days. Parturient troubles are seen in commercial queens but are common in pets. In obstetrical work on cats the first thing to consider is the state of the bladder. When the tension of a full bladder is relieved delivery usually proceeds normally. If catheterization is not

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possible (it is never easy for me), the bladder can be evacuated safely by puncturing through the abdominal wall. It is remarkable how often this will end all trouble.

Queens prefer to hide during parturition. In the hospital it is important to give them secluded quarters. As it is quite common for a queen to refuse her young, one should have a foster available at all times. A method of making a queen care for her young is to smear them over with butter. This will often make her change her mind.

While there are many different opinions about feeding kittens, I believe all agree that meat should not be fed until they are eight weeks old.

In selecting a kitten it is not easy to tell what will be the color or character of the coat until about six months of age. This is especially true of black, chinchilla or Siamese. The latter are born white and the tips of their ears begin to change color in about 36 hours. And, don't be too sure you can tell the sex of a young kitten.

#### HOSPITALIZATION

In hospitalization cats acclimatize more readily than dogs. Their fright is allayed more quickly. They soon become interested in their new surroundings. Patients that refuse to become reconciled to their hospitalization can be pacified by placing a mouse in a jar where they can watch it.

Cats are susceptible to drafts and dampness even in warm weather. Temperature is less important, other than that extreme heat causes discomfort. In accepting cats for the hospital one must pay attention to vermin of all kinds, particularly ringworm and lice.

We avoid surgical operations until the patient has eaten a regular meal and we endeavor to completely evacuate the bowels by means of an enema or laxatives.

The ease with which feline patients are handled is governed entirely by one's attitude and the methods employed. Cats object very strenuously to being tightly held. You can handle some of the most nervous cats on the table simply by baffling their efforts. When necessary to completely re-

strain a cat for such as ear and teeth work, I know of nothing better than a square piece of pliable, middle-weight canvas, as cats are somewhat like rabbits and seem secure in hiding. This can be applied so that it is possible to work on either the head or extremities.

The advancement that has been made in recent years in anesthesia and the ease of administration has greatly simplified handling where a complete restraint is required, eliminating the use of stocks and tongs. It is very simple for the average attendant to jack-knife a cat but it does not make a good impression on the owner.

Cosmetics play a very important part in the hospitalization of cats. There are some tricks that simplify the work. Bedding kennels with reasonably fresh newspaper has a beneficial and cleansing effect on their coats, particularly the white ones, and eliminates much bathing which we all know should be avoided as much as possible. Frequent combing and brushing, with considerable hand-rubbing, are necessary procedures. The brushing of long-haired cats should be done against the fur toward the head. If it becomes necessary to clean a dark colored cat, rub warm bran or corn meal into the fur and follow with a good brushing. On light colored cats use flour or white fullers' earth, and charcoal for black cats. A mixture of whiting and bluing for white cats will greatly improve their looks but is not permitted on cats for exhibition.

In examining hospital patients (and usually the history is very vague) I would suggest that you first make a general observation of your patient. Thoroughly check the eyes and then the ears. If otitis is present determine whether parasitic or not. Make a complete examination of the mouth—very often heavily calcium-coated teeth will be the entire trouble. Injuries to the tongue and buccal membrane are often obscure and easily overlooked. A thorough examination of the coat is necessary. It is surprising how many cats carry lice and manifest no apparent discomfort. When examining injuries be guarded in your

prognosis as it is easy to pass over a bone involvement. It is important to establish free drainage, much more so than in a dog. Either the peculiar action of the serum or the texture of the skin causes the serum to travel in many different directions, showing no inclination to point. I even allow a fresh incision to remain open at one end. This has eliminated trouble I once had with hernias following a median-line incision.

#### FRACTURES

Fractures are about the same as in other small animals. I used to have considerable difficulty in holding casts where there was little angulation. (You know it is your scalp if you clip the hair from a long-haired cat, injury or no injury; recovery may be perfect but a mutilated coat will bring plenty of criticism.)

I use a yucca-board splint covered with adhesive tape, adhesive side out, and apply it right to the fur where it will stick in place and also keep the bandage from slipping and then cover it over with tape. It makes a light, satisfactory splint. I find moist-proof adhesive will retain a better appearance longer than the common adhesive.

#### CONCHAL HEMATOMA

One of the most troublesome conditions I encounter is hematoma of the ear. I always advise my clients of the great possibility of a withered ear of some degree. I would like to give you my procedure which has been more successful than anything I have been able to devise. If you have experienced trouble with this condition, I would suggest you try it.

If possible we try to accustom our patient to an Elizabethan collar (usually plenty of fire-works when you start), before operating. Under complete anesthesia shave the outside surface of the ear, removing all oils and giving special attention to the otitis which is usually present. Apply a strip of adhesive tape to the back of the ear, allowing it to extend beyond the tip. Then proceed with the opening and draining, curetting if necessary. Place a pledget

of gauze under the edges of the wound. Apply another piece of tape to the free end of the piece already on the ear. Draw the ear firmly over the crown of the head and completely encircle the head with the tape. The patient appears to experience less discomfort with this procedure and for me the results have been much more satisfactory.

#### CASTRATION

In closing I want to comment on the so-called simple operation of castration. I was taught, and practiced for years, the procedure that I know is generally used—the removal of the organs by torsion. The frequent inability to void urine in the neutered male, with no apparent mechanical stoppage, led me to give it considerable study. In observing the results of torsion viewed in a cadaver and considering the attachment of the vas deferens to the bladder and the prostate, it was only reasonable to expect an injury to the nerve and muscular tissues of the neck of the bladder. After comparing other methods as against torsion, in several hundred cases, there is no question in my mind but that the spastic contraction of the neck of the bladder as so often seen in the neutered male, is due to injury at the time of castration.

In the time allotted to a paper of this kind, it is possible to touch on only a few phases of the subject. Perhaps some in the audience may like to raise a question on some point in my remarks—if so, I shall be glad to clarify with more detail.

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The natural markings of dogs are apt to be so nearly alike that the coat mapping is not reliable for identification. To be positively identified dogs should be tattooed.

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Lack of definite data on the dog population is shown by two conflicting newspaper articles, one saying "There were 15 million dog licenses issued in the United States," and another setting the total number of licensed dogs at less than four million.

## Veterinarians in National Economics\*

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SPEAKING to veterinarians about their place in national affairs would not be as necessary were zootechnics taught systematically from the ground up in the veterinary colleges. By virtue of its name, veterinary science should treat of domestic animals in every estate. In English-language countries, this science has dealt with disease only. Animal medicine and animal husbandry drifted apart to mutual disadvantage. Both suffer from "knowledge deficiency" when the one treks into the sphere of the other. Knowledge of the medical sciences is certainly the minimum requirement for a practical understanding of animal production. The separation of medicine and husbandry has brought a great deal of quackery into both fields. The bent was inevitable. The two studies are interlocking. Unavoidably, the practice of one leads headlong into the other, often far beyond the ken of the practitioner of either field. It is a delicate matter to say that the husbandman is not qualified to write boldly about medical problems or conversely to remind the veterinarian that his knowledge of zootechnics is not complete. Yet the fact remains that both are but half trained in the other's field. Veterinarians and stockmen of the English-speaking countries are blundering through this manifestly wrong set-up and neither has been able to defend domestic animals as being the main source of human existence. Society lives on serenely unaware that there would never have been a civilization but for the domestication of animals. If we ever have a king of the world, he will be an animal husbandman like Hammarubi or Moses whose kingdoms flourished through many more centuries than the short period of modern times. Conquering the great animal plagues is not sufficient. The insidious ailments of live-

stock that keep farming on the verge of bankruptcy require more attention. These do not spur the people to perfect the veterinary service. Our task, therefore, is to develop an educational and police system conforming to the contemporary knowledge of all animal diseases.

Veterinary science and agriculture have to somehow inform the people that increase of populations; development of wealth; prevention of want and pestilence; evolution of the arts and sciences; improvement of culture, human intelligence and physique; and the recreations which make life worth living, rest primarily upon a wisely directed animal industry. An unfinished task of organized veterinary medicine is to bring these facts before the court of public opinion. But, in preparing our case for trial we must first raise our scientific standards and our professional conduct. We need larger schools and more veterinarians, better literature, better and more research, better skill, a broader knowledge of zootechnics, and better ethics. But these bounties will not come until we ourselves understand their meaning. Our educational system has been remarkably reformed in the past 20 years; our literature has improved; our scientific researches have struck a good stride; clinical work, though poorly protected by law and custom, has changed from bad to excellent; and we are beginning to realize unethical practices lower our rating. But, what good is all this achievement to us in the media of an uninformed population?

Animal husbandry should be a major branch of veterinary medicine and one particularly delegated to establish in the minds of the people the place domestic animals occupy in national economics. The veterinary profession can establish that rating by keeping science and practice of the right sort uppermost in mind. Animal husbandry is not a profession organized

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for systematic action. It is an art with free-for-all application, divided into as many components as there are species and breeds of animals. While an art not lacking in experts or literature, it lacks the centralized effort of a closely organized profession. I am thinking of zoötechnics as a study comprising everything from the raising of song birds to the racing of horses and the production of wholesome food of animal origin. Every ramification of animal industry, and it has too many to mention here, is founded upon four branches taught in the veterinary college: anatomy, physiology, pathology and chemistry. All other branches are units within these four basic studies. A sufficient veterinary profession can and in the end will bring about a better understanding of this fact.

#### ANIMALS AS A UNIT OF WEALTH

The fact that all life exists from a thin layer of soil should not be a hard lesson to teach. Yet, it is a lesson that has neither been well taught nor well learned. It seems that it can not be taught except by a well-organized veterinary profession. No other group of this day exploits domestic animals as a single unit and none is as competent to tell the story of the animal-disease potential in this civilization. There are societies promoting species and breeds and societies exploiting the manufacture, distribution and use of animal products but none of these except the veterinary societies can ever treat with domestic animals as a whole. Inasmuch as the control of disease and of its unseen power underwrites successful animal production, it is to us mankind should finally look for guidance. Our profession's *greatest failing is not having aroused public interest in our behalf*, and the same token applies to animal industry. In the preparation for war 20 years ago, Germany started by building up its animal production. A distinguished veterinarian (Weber) was placed in the chancellor's cabinet to supervise that phase of preparedness. The *Chicago Tribune* thought this was quite a joke on Hitler. What could more clearly emphasize what I am trying to say? While this was going on, official Britain, which always, since the

days of Charles Vial de San Bel, regarded the veterinary service as a kind of superfluous fringe, did nothing to augment its animal possessions. England is now paying \$10.00 to \$20.00 an acre to landowners who will plow up their pastures, hunting grounds and golf courses. It has taken this horrible conflict of arms to teach the lesson that man is subordinated by products of his domestic animal holdings. It requires war or sweeping animal plagues to arouse the public conscience. As stated above, the subclinical ailments which rob by stealth and cause uncomputed losses are not studied in national economics. Injurious plants, minerally deficient forage, worm parasites and insects, and viruses and bacteria and protozoa which gnaw at the profits of farming unnoticed are so many factors which never aroused sufficient public interest to bring about sustained programs of control. Knowledge of, let us say, the subclinical diseases is 30 or more years ahead of the people's desire to subdue them.

#### WHAT TO DO?

Building up affluence for veterinary science is the first step to be taken. We can not hope to make folks listen to our story until we ourselves become men of affluence. From the smallest practitioner in the remotest corner to the best scientific clinician of our finest hospitals, from the research worker in the seclusion of his laboratory to the teacher of the recruits, from the regulatory officers of the government and states to the commercial groups we look to for reliable supplies, from the most negligent members who do not support their profession to the most ardent workers of our societies, from the most ethical groups to the objectionable advertisers, there are reforms to institute and burdens to bear before we can achieve the affluence of which I speak. It's all a matter of going before the public with sufficient scientific attainment in one hand and good conduct in the other. Only organized veterinary medicine wisely managed can accomplish that rank. Persuading veterinarians to join societies is

primarily a means of propping up national wealth and security and I can conceive nothing more patriotic.

Boiled down to practical terms, in the veterinarian who has pursued the studies of a competent veterinary-medical curriculum including zootechnics in its broadest sense lies the hope of an agricultural nation; and in his scientific status and his conduct lies the hope of acquiring the affluence the public will honor. This is not an impractical generality, as it may seem. We are at the threshold of a period whence we will go upward or downward according to the wisdom we use in shaping our conduct and improving our knowledge. Both are within our reach. Both can be accomplished through the progress veterinary science has made in recent years. We are beginning to labor in concert as members of one profession. Our work is attracting more attention. Science quotes more freely from our literature, books compliment our service, newspapers and magazines are taking notice of our activities. Only statesmen overlook the bigness of things veterinary. The oversight is expressed in the meager appropriations made to carry on. This, of course, is public opinion in action, the theme of this essay.

On coming upon the scene, 52 years ago, I recall being astonished at the lack of coöperation between the different branches of the profession. Listening to the state veterinarians backbiting at the small federal forces of that time; watching the state schools using harsh language against the privately owned ones and *vice versa*; noting the hostility of one practitioner against the other; and observing the meager progress associations were making, were so many outstanding faults of the veterinary profession which made a deep impression on my mind—an impression of despair over having come into the membership of such a fighting crowd. The work stretching ahead for veterinary science was apparent. Contagious pleuropneumonia was getting rampant in Illinois; hog cholera was sapping swine breeding; Texas fever was demoralizing; glanders was a nightmare; and horses, indispensable to farming and the industries, were victims of many ailments. In

this Golgotha, there was no question as to the importance of veterinary work but the lack of coöperation among those so engaged was manifestly depressive. There were two things to do. The one was to jump in and do some of the fighting and the other was to see what could be done toward developing a spirit of fraternity not alone between practitioners but more particularly between the different branches of which veterinary science is composed, and through that spirit try to impress the public with the significance of our art. Wonderful progress has been made in handling the diseases named above and in cultivating harmony among practitioners but less has been accomplished in cementing the major branches together and convincing the public that domestic animals (their production, their health and their care in disease) is fundamental to the welfare of mankind.

The reason that veterinary science as an economic question remains so obscure in this country is that we have done the impossible thing of trying to separate *animal health* from *animal diseases*—two sciences which are inseparably dove-tailed. No understandable line of cleavage can be drawn between them. An example outwardly expressed is the futile attempt of recent years to define where the duties of the farm adviser end and those of the veterinary service begin. The endless strife between two groups working to the same end has confused the public to the disadvantage of both. Except for the figures furnished by the meat- and field-inspection service of the U. S. Bureau of Animal Industry, the price paid for disease of animals is unknown. On account of the complex political makeup of our country, no agency was assigned to find the facts. Only a well-directed veterinary profession can determine the truth in this respect.

Knowledge of animal diseases properly applied can insure the wealth of this nation. Stricken France remains self-supporting through the zootechnics that was taught in its veterinary schools. By appointing a veterinarian a minister of the Reich, Germany in less than 20 years became nearly self-supporting for the first time in its history. An insufficient animal

industry wrote defeat into German history in 1918, a sufficient one in 1941 appears to be giving it control of a large proportion of the civilized world. In the United States, a fertile soil and abundant acres in addition to other natural resources have covered up the effects of our blundering ways. Things which should have been done 75 years ago, when associating animal diseases with human welfare was too vague to be an issue of statesmanship, are now here for the veterinary service to act upon, wisely. The potentiality of animal diseases and of the borderline states of ill health is the veterinarian's problem. Inasmuch as animal diseases have imperiled or vanquished many a nation through history and are ever present, our duties are mapped out. The first one of these duties, let me repeat, is to bring about general agreement in regard to the dependence of man upon domestic animals. The fact that there is no accord in this respect is a challenge to human wisdom and impressing the public mind with this fact is our greatest unfinished job. Man's hope of remaining on earth, not to mention happy and secure, lies less in combating human diseases than in furnishing human necessities, in these days of international strife that seem to be taking us back to life and ways of the caveman. The animal plagues of the Middle Ages and Renaissance were forgotten through the achievements of a science that provided abundantly for the multiplying populations. The wealth of nations developed through the founding of veterinary schools in the eighteenth century has been taken as a matter of course. Only wise economists realize that all we have in wealth, comfort and pleasure is the gift of the domestic animal populations that veterinary schools created. The underlying facts are overlooked in the chaos of an unprecedented industrial development which has intoxicated the population of this period. It is only now and then when spectacular infections of our animals sweep down upon us that the public becomes aware that we do have an army of disease fighters under arms prepared and trained for such emergencies. But, what the veterinary service does day in and day out in

behalf of national economics is as unknown to the people as Einstein's theory and of no more interest to the masses than the fourth dimension.

By common consent veterinary science is a branch of agriculture of which animal production is regarded as a sideline and we a fringe of the latter. The order needs revision. Animal production comes first because in order to farm there must first be animals to do the tilling and furnish food. The hoe and man-drawn plough could not have created much of a civilization. Even if Cain and Abel had used tractors, they would still have needed animals to feed their offspring. When Noah took to the Ark, he didn't take on a cargo of seeds and plants; he wisely loaded up with animals in order to give agriculture a new start. The people of 1941 have yet to analyze that wisdom. Judging from the present rating of domestic plants and domestic animals, a Noah of 1941 would load up with seeds and leave the animals to perish in the flood. Where veterinary science fits into this picture is preserving animals to the extent that made possible the development of the great nations of the present time.

In organizing a front for our profession let us not yield one inch of ground in expounding the fact that what the world enjoys today in wealth and strength was started when veterinary schools and services were founded by Louis V. This means that animal production is the parent, not the child of agriculture, and that cultivating veterinary science which preserves the amplitude of animals, in the midst of a congested population, is a human duty of the top rank. That it is necessary to write an essay on "the veterinarian in national economics" at this late day is unfortunate. Important discoveries in veterinary science which have favorably affected human welfare are barely known to the present population of this country. The small amount of money appropriated for veterinary science and the meager moral support it receives is not at all comparable to the debt owed to this branch of human endeavor. If anthrax, blackleg, glanders, Texas fever, pleuropneumonia, rinderpest, hog cholera,



tuberculosis had not been held under control, I wonder what kind of a United States this would be.

The job before us is to improve this public relation. The failures of the forefathers are ours to ameliorate through the quality of our work on the one hand and telling folks about it on the other. The world will not go on forever ignorant of the source of its wealth and affluence. The health of domestic animals has become so utilitarian in the affairs of man as populations multiply that the practice of veterinary medicine in coming generations is certain to win popular appreciation and a place of great honor in the hearts of the people. If not, the coming generations will be unfortunate.

By hard work we have won some approval by other branches of science and through the same token our rating by the public has improved. There is more honor in being a veterinarian than 50 years ago because an inkling of the profession's achievements has filtered into the public conscience, but the masses live on unaware of the source of their largesse.

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### Supercharged Flour— An Epochal Advance

The modern mill removes from flour nearly all of the thiamin, nicotinic acid and riboflavin—the ingredients which gave bread the credit of being the staff of life. These precious fractions are “scalped from the wheat grain and fed to swine” the author declares. [They, however, get back to the human diet in pork.] One slice of the bread of our forefathers was the equivalent in vitamins to five slices of the snow-white bread of the present time. Wheat is one of man's most fundamental discoveries. It raised man from hunter to farmer but with the coming of power machinery, less than 100 years ago, the life was scalped from the wheat grain. Realizing the seriousness of the depletion, unconsciously developed before the vitamin era, the Millers National Federation recently sponsored a convention in Chicago to discuss plans for correcting the mischief. The meeting com-

prised millers, bakers, chemists, vitamin hunters, physicians and government experts. Surgeon General Parran of the U. S. Public Health Service presided. Among those present were Under Secretary of Agriculture M. L. Wilson, Drs. Russell M. Wilder and R. D. Williams of the Mayo Clinic, Chemist R. R. Williams of the Bell Telephone Laboratories, and Research Director Alonzo E. Taylor of General Mills. The meeting was a voluntary, private gathering, not a federal government function designed to set down regulations on flour production. The object was to discuss plans for restoring our devitalized wheat bread to its former food value, not by going back to the superannuated milling of the distant past but, if feasible, by the gigantic task of reinforcing modern flour with the lost ingredients, for a population of 130 million people. While the millers' spokesman pronounced the step impractical on account of the prohibitive cost, the chemists pointed out that nicotinic acid is cheap, and that the cost of thiamin would probably be reduced to 12 cents a gram when the chemical industry swings into mass production. Volume production of riboflavin is also possible.

The author pronounced the meeting “momentous” and declares that re-vitaminizing our flour is “the greatest single stroke, for human health, attempted in our generation.” [*de Kruif, Paul. Supercharged Flour—An Epochal Advance. Reader's Digest, January, 1941, pp. 111-113.*]

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Milk hygiene is in its infancy. But two or more decades ago there were no regulations at all in many places and any person or farmer with two or more cows and a bucket was allowed to call himself a dairyman and could peddle milk to any one ignorant enough to buy it.—*Jack C. Norris, M. D., Certified Milk, Dec. 1940.*

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The most common mistake made by swine raisers in preparing rations for growing pigs is failing to realize the importance of vitamin A and protein foods.—*J. C. Hiller, Oklahoma A. & M. College.*

# SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

## Vitamin K (= Anti-Hemorrhage Vitamin)

Although not particularly significant in veterinary medicine, vitamin K belongs to the dramatic medical discoveries of the present time. It concerns everyone at all interested in saving the lives of the many tiny babies who perish of hemorrhage at



Dr. Henrik Dam  
Discoverer of Vitamin K

birth or soon after, or of adult victims of hepatic diapedesis (obstructive jaundice).

The discoverer of this anti-bleeding vitamin is Dr. Henrik Dam, Biochemic Institute, University of Copenhagen, who is visiting this country where a great deal has been done by obstetrists to bring his discovery into practical use.

## Stallion Registration Laws

Revision is needed in the laws which forbid the use for public stud service of stallions affected with so-called hereditary diseases. These laws, spread upon the statutes of many states, seem to have been enacted in advance of scientifically established facts. In naming certain diseases supposed to be transmitted by stallions to their offspring, too much was taken for granted. The stallion registration laws

were based upon premature conclusions arising from faulty observations.

Diseases now proved to be acquired were pronounced congenital without equivocation. Particular stress was placed upon the osseous vegetations (spavin, ringbone, etc.) now listed under another head in equine ecology; upon post-tarsal injury called curb which is obviously a strictly traumatic blemish; upon roaring well known to be caused by a toxi-infectious damage to the laryngeal innervation or by violent cardiovascular action; and upon ocular troubles (night blindness, ophthalmia, keratitis, cataract) which are not supported by any reasonable hypothesis and yet attributed to a paternal cause without compunction or legal reservation.

The coming of a better understanding of the environmental causes of practically the whole group of ailments disqualifying stallions for public service has outmoded the existing stallion registration laws to such an extent that some of them, at least, should be brought up to date.

The position of these laws on the statutes in the light of present knowledge carries the warning not to pass laws of this type on consensus not proven by factual evidence.

## Recalls an Old Practice

Lamb marking consists of castration, ear marking, and docking the tail. It requires two men to operate with dispatch—a catcher and an operator. The catcher holds the lamb by the four legs, two in each hand and sits on a rail. The operator then cuts off the tip of the scrotum, pushes the testicles up with the first finger and thumb, grasps them with his teeth and pulls them out with steady strain.—W. Moulden, *The Journal of the Department of Agriculture of South Australia*, Oct. 1940.

# Epizootic Lymphangitis of Solipeds\*

G. A. ROBERTS,† D.V.S.

*Ciudad Trujillo, Dominican Republic*

WE ARE tempted to write this sketch because of an unusually severe outbreak of this disease last year in the cavalry horses belonging to the Dominican Republic. In this country the disease is known by the name of "culebrilla" because of the frequently observed chain of enlarged lymph nodes. At times the intervening lymph vessel is somewhat swollen.

The disease is of a chronic, infectious

where the disease is rather frequently observed.

*Prevalence in the Dominican Republic:* In this country the trouble is usually sporadic. Out of ten it may occur in only one, or at most in three or four in a herd of 25 to 100. Not infrequently it occurs in but one animal where only a few are kept.

We have seen seven to ten cases at the same time in herds of 200 to 300 but with



Fig. 1. Group of army horses affected with epizootic lymphangitis (= culebrilla).

nature affecting solipeds. It has been observed by us only in horses and mules. Donkeys, which are numerous here, seem to be immune. The cause is supposed to be the yeast fungus *Saccharomyces farciminosus*.

## OCCURRENCE

The disease occurs in many countries of Europe, Asia, Africa and the Americas. Though not common in the United States it has been reported by Pearson in Pennsylvania, Fischer in Ohio and Mohler in Iowa, California and North Dakota.

Our intention is not to discuss the disease in detail, but to confine our remarks to observations in the Dominican Republic,

\*Known also as saccharomycosis, African glanders, Japanese farcy, and in Spanish American countries as culebrilla, meaning small snake. The latter name is also used for ringworm.

†Government veterinarian for the Dominican Republic.

little tendency to extend further until 1 to 2 years later, when an equal number may appear.

During the past year, however, we had an unusual experience in the Dominican cavalry horses where some 33 or about 30 per cent of all the horses were affected. Most of these horses came from the United States two years previously. The cavalry had been increased recently by 25 more horses from the United States which on arrival were sent to a mountain retreat to become acclimated. Most of them arrived with, or later developed influenza, accompanied with the usual complications. Two of them died.

Care was not taken to prevent contamination of nearby high grade Arabian horses, hence 12 out of 15 developed our old type of strangles (distemper). However, all of these recovered.

Returning to our subject proper, on Jan-



uary 27, 1940 we were called to the cavalry stables (Escuadron Militar) to see 12 horses affected with epizootic lymphangitis (culebrilla). These horses were kept in large, roomy, open sheds with a wooden partition in the center and feeding mangers on each side of the partition. All of the affected animals were treated and the sheds

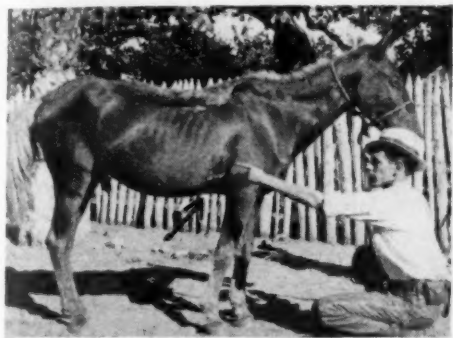


Fig. 2. Enlarged lymphatic vessel, lower thoracic region. Dart and boy pointing out the engorged vessel.

were given a thorough spraying and scrubbing with a strong solution of creolin, but new cases continued to occur until 33 in all were affected. The apparent origin was the introduction to the sheds of a small native horse which soon developed characteristic symptoms of this trouble.

The mode of transmission from animal to animal was not determined, but flies were suspected as being the vectors.

This condition was unusual in this country, both as to the number of cases in a single group of animals and as to its severity. Two animals died from emaciation, apparently due to absorption of toxins from the ulcerous wounds; 12 recovered from the disease but remained with chronic elephantiasis; and 19 made complete recoveries.

#### SYMPTOMS AND LESIONS

A short or longer chain of nodules appears in almost any part of the body. We have observed the nodules to be most frequently located near the base of the neck extending downward on the fore leg. They have also been noted, in order of frequency, on the hind leg, lower thoracic region and on the face near the mouth.

For no known reason the lesions have generally appeared on the right side of the animal in all of the above mentioned locations, but there have been exceptions. The nodules vary from the size of a pea to that of a hen's egg. Some of the nodules remain intact, others break down and form ulcers. The larger ones suppurate but rarely open spontaneously. At first there is little swelling of the lymphatic vessel intervening between the various nodules, but later the vessel becomes plainly visible.

At times the swollen lymph glands interfere with the free circulation of blood and cause slight or large edematous swellings. Most frequently these swellings have involved one or both of the affected hind legs. If treatment is given early the elephantiasis is temporary, otherwise it becomes permanent.

Another interesting feature observed the past year, which may or may not be associated with the disease, was marked edematous swelling of the scrotum, not involving

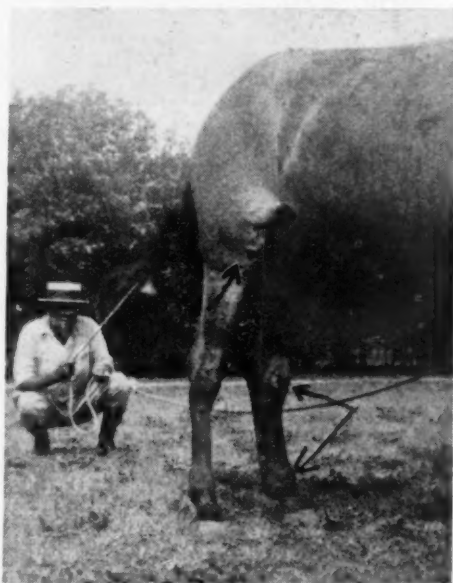


Fig. 3. Chronic elephantiasis of near hind leg and ulcerous nodules. Darts point to the ulcers.

the testicles. These swellings occurred in animals in service, but as many males are left uncastrated, some appeared in animals not in service. So far as we recall only one

showed any typical lesion of epizootic lymphangitis, but all recovered after being treated for this disease.

#### DIFFERENTIAL DIAGNOSIS

Since glanders does not exist here there is little difficulty in reaching a positive diagnosis. Further evidence may be obtained by finding the specific fungus in the pus or ulcer secretion.



Fig. 4. A chain of healing ulcers extending from the base of the neck to the fore limb.

#### COURSE AND TREATMENT

The disease is of a chronic nature and may, after a few months, result in spontaneous recovery. Others usually respond to treatment, but a few resist all measures attempted.

Various methods of treatment have been employed. The standard one has been neosalvarsan (914) 0.9 Gm., intravenously, repeated if necessary at two week intervals. All abscesses should be opened. A few years ago an agricultural agent in the country reported good results from the use of anthrax vaccine. Since we had been unable to find anthrax in the country we condemned the use of a virulent vaccine here, but the report suggested to us that possibly the results were due to a nonspecific

action. We, therefore, tried sterile milk, 10 to 15 cc. subcutaneously, and were gratified with the results in most cases. In some, however, recoveries occurred more rapidly when alternated with neosalvarsan. As some extensive chronic cases refused to respond to either of these agents, they were treated by incising the nodules and cauterizing them with nitric acid or actual cautery. The most effective, however, was the total extirpation of all affected lymphatic nodules and vessels.

[Although, epizootic lymphangitis is not generally regarded as a surgical disease, the fact remains, as the author points out, that extirpation of the nodules/ulcers is always advisable.]

#### Wound Healing and Avitaminoses

The failure of wounds to heal in obedience to the normal schedule of regeneration may be due to a subclinical avitaminosis affecting the integrity of formative tissue. Devitalizing disease, allergy to catgut, low plasma protein, interrupted local circulation from severed vessels, stitch tension, and general anemia are so many local and systemic deterrents to the normal regenerative process. While dehiscence of the surgeon's wounds from infection ranks first among the causes of interrupted repair, all factors affecting the cellular activity that weaves a solid reunion require attention. Among these factors there are certain avitaminoses to be considered in the study of surgery, particularly in regard to their effect upon the reconstruction of injured structures. Vitamin B<sub>2</sub> (riboflavin) and vitamin C (ascorbic acid) are now rated among the supports of wound healing. Correcting subnormal levels of these vitamins is named among the preparatory steps of serious surgical operations. Hartzell and Winfield<sup>1</sup> observed that in a majority of their "wound disruptions" vitamin C levels were below normal.

<sup>1</sup>Cited in Therapeutic Notes, Dec. 1940, p. 340.

# Mapharsen as a Treatment for Enterohepatitis of Turkeys\*

F. M. BOLIN, D.V.M. and P. H. VARDIMAN, D.V.M.

Fargo, N. D.

W. P. Blount<sup>1</sup> reported successful treatment of clinical cases of enterohepatitis (blackhead) with mapharside,† an organic arsenic compound called mapharsen in America. It is in powder form sealed in ampules of .06-Gm. doses, with sterile distilled water as diluent. The cost of treat-

lesions of two similar cases showed blackhead was present on the premises.

As an aid in making a definite diagnosis we attempted to run the Rose Bengal liver function test on 9 birds, using as a basis the method described for use in sheep by J. N. Shaw.<sup>2</sup> One per cent Rose Bengal

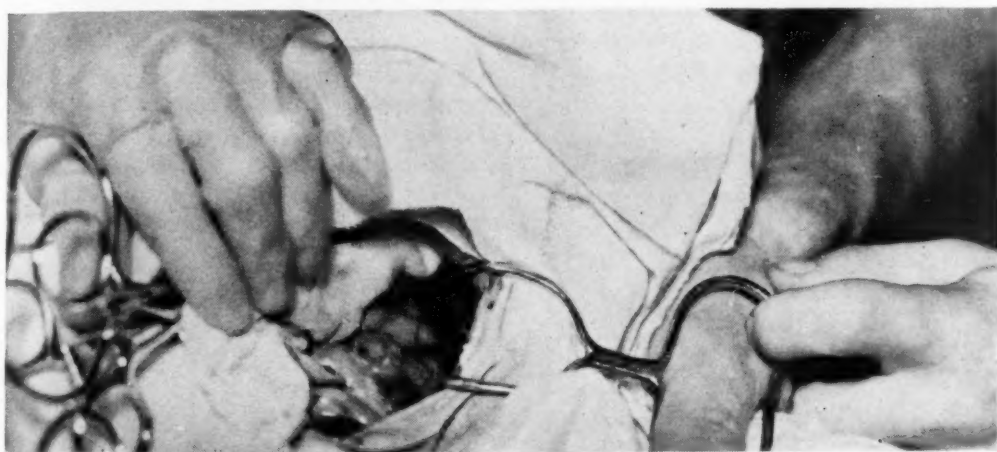


Fig. 1. Lesions of enterohepatitis on exposed surface of the liver.

ment per bird as described herein is not excessive.

The following is a preliminary report of the results from the use of mapharsen in cases treated at the North Dakota Agricultural College including description of two methods which were used to help in the diagnosis of the clinical cases.

These birds were banded, treated and sent back to the farm. Three out of five lived and band numbers were checked at market date. At the time of treatment they all showed typical symptoms of blackhead and three days before, postmortem

dye was dissolved in 0.85 per cent sodium chloride solution and 6 per cent dextrose added. Three cubic centimeters of this solution was injected intravenously into each bird. Blood samples were drawn at 2 and 10 minute intervals for colorimetric comparisons of the serum. Difficulty was encountered with this method. There was a visible difference between the amount of dye removed in normal birds as compared to blackhead cases. However, a brown pigment, presumably resulting from hemolysis of red blood cells, made colorimetric comparisons inaccurate. Even after decreasing the amount of dye to 1 cc. of a mixture containing 0.5 per cent Rose Bengal the same difficulty was encountered. All clinical blackhead cases injected with the dye solution died. One normal control bird

\*Contribution from the North Dakota Agricultural Experiment Station. Published with the permission of the Director of the North Dakota Agricultural Experiment Station.

†Supplied by Parke, Davis & Company, Detroit, Mich.

<sup>1</sup>Blount, W. P., *Veterinary Journal*, xciv (Aug-Sept. 1938), p. 344.

<sup>2</sup>Shaw, J. N., *J.A.V.M.A.*, lxxii (Feb. 1933), pp. 199-204.



TABLE I—Cases Treated August 27, 1939.

| BIRD NO. | TREATMENT                          | RESULTS               |
|----------|------------------------------------|-----------------------|
| 66       | .006 Gm. mapharsen intramuscularly | Fattened and marketed |
| 83       | .006 Gm. mapharsen intramuscularly | Fattened and marketed |
| 509      | .006 Gm. mapharsen intramuscularly | Died                  |
| 535      | .006 Gm. mapharsen intramuscularly | Died                  |
| 692      | .006 Gm. mapharsen intramuscularly | Fattened and marketed |

from a group of four died from similar dye injections.

Postmortem examination showed the livers swollen and deeply stained with dye, large amounts having accumulated around the liver lesions. The Rose Bengol is not eliminated rapidly enough from the blood



Fig. 2. Catgut sutures in position to close the wound.

stream of normal turkeys or birds affected with blackhead to make this test of value in determining the relative functions of the livers. This procedure was, therefore, discontinued in favor of laparotomy as a method of diagnosis.

The liver of bird 669 was examined through a laparotomy wound, Dec. 14, 1939. Liver lesions were gradually healing but some necrosis was still evident. This bird and No. 23 gained in weight and recovered.

Blackhead investigations were put on a project basis June 12, 1940. Hen 669 previously mentioned which had recovered

from blackhead, and hen 0 which had never had a clinical case of blackhead, were mated during the spring of 1940 to a healthy tom. From these matings 26 poults were hatched, 13 from each hen.

Exposures of these poults by various methods showed that each group was equally susceptible to blackhead. Massive exposures to fresh material by various methods resulted in mild liver lesions on autopsy in 9 out of 17 exposures. Five of these infected birds showed progressive



Fig. 3. The closed wound.

subclinical blackhead when examined microscopically. These poults ranged from 70 to 165 days of age at time of exposure.

Diagnoses of clinical cases were again made by examining the livers through laparotomy wounds. Figures 1, 2, and 3 show details of the operative technic. No anesthesia is necessary. The incision is made through the skin and muscle layers in the V-shaped area

TABLE II—Cases Treated December 9, 1939.

| BIRD NO. | WEIGHT   | TREATMENT                          | WEIGHT    | DATE     | RESULTS   |
|----------|----------|------------------------------------|-----------|----------|-----------|
| 23       | 9. lbs.  | .006 Gm. mapharsen intramuscularly | 12. lbs.  | 3/6/40   | Recovered |
| 669      | 7.1 lbs. | .006 Gm. mapharsen                 | 14.2 lbs. | 3/6/40   | Recovered |
| 694      | 4.7 lbs. | .006 Gm. mapharsen                 | 4.3 lbs.  | 12/11/39 | Killed*   |

\*On autopsy this bird showed partially healed lesions.

bounded below by the upper edge of the most distal lateral process of the sternum and above by the most distal portions of the ribs and the proximal lateral process of the sternum. This point may be located by running the index finger along the lower portion of the ribs as far forward as possible. The incision should start here and extend backward at least 1.5 inches. The tissues are separated and the serous covering which lines the abdominal cavity and makes up the lateral air sacs is punctured. A flashlight or other light with a focus point is often necessary to illuminate the cavity. The incision is closed by catgut mattress sutures No. 3 extending through skin, muscle, and peritoneum. Birds make rapid recovery from this operation if ordinary aseptic precautions are taken.

Five turkeys have been examined by this method, treated with mapharsen, and reexamined 2 to 3 weeks later by operating again. In all cases the lesions have disappeared or have shown healing.

In addition to these laboratory results, 4 flocks on separate farms, approximately 300 birds, have been treated by this method during outbreaks of the disease with a marked drop in death loss.

#### SUMMARY

Six out of eight clinical cases of blackhead treated with mapharsen recovered.

Attempts to diagnose blackhead by the Rose Bengol liver function test failed. Birds affected with blackhead were unable to eliminate the dye and died as a result.

A surgical technic by which accurate diagnosis may be made for experimental purposes is described.

Although this report covers only a small number of cases these results are encouraging.

#### Castrate the Male Dogs

Since the disposal of errant dogs is placed at the top of all measures advocated in the control of rabies it seems rational to ask just what steps the veterinary profession is taking to put that part of the prophylaxis into practical use.

One step in the right direction would be to recommend the castration of all dogs not wanted for breeding. The difference in intelligence, physique and profile, and

in general behavior between the gelding and the stallion, the wether and the ram, the steer and the bull, would be a good argument in favor of that step, even though the improvement of breeds were not considered.

Moreover, from the standpoint of policing animals there are reasons other than rabies for manhandling the canine population. One of these is the killing of sheep and poultry and other farm animals occasionally by dogs which, in spite of centuries of domestication, are more liable to revert to their primitive instincts than any of the other domestic animals. The indemnities paid for the depredations of roving dogs run into large figures. Farm animals killed by them and paid for by taxpayers is a high price, in money and cruelty, to pay for permitting dogs to have their own way of life and reproduction.

Writing editorially on the vicious behavior of some dogs, *Our Dumb Animals*, where we look for everything that's fine in behalf of canine welfare, says: "To come upon sheep mangled, dragging their entrails across the pastures, to die in misery or to find in some lonely spot deer with their fawns torn to pieces, dying or killed by dogs, quite naturally with some people causes the denunciation of all dogs." [It has been said that more deer are killed by dogs than by hunters.] "This destruction," says the writer (*loc. cit.*), "has aroused a public opinion that demands that something be done to prevent the annual massacre of these beautiful creatures."

Thoughtful cynophiles are beginning to realize that spurts of snaring and killing of loose dogs when rabies breaks out can never make a dent in the stray dog population as long as free-for-all reproduction remains unchecked. The reason the veterinary profession is not rolling up its sleeves to fight the stray dog is that preventive medicine strikes first at the source of the trouble at hand and has no patience with such impractical schemes as dog catching and the execution of dogs which should not have been born.

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# CLINICAL DATA

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## Cystitis in a Stallion Due to an Amorphous Calculus with Involvement of the Genital Tract

A. G. KARLSON, D.V.M., M.S., W. L. BOYD, D.V.S.

*St. Paul, Minn.*

and D. B. PALMER, D.V.M.

*Wayzata, Minn.*

THIS IS THE case of a ten-year-old stallion first seen because of vague symptoms of abdominal distress which subsided under symptomatic treatment. Three weeks later the animal developed dysuria marked by frequent straining and elimination of small amounts of cloudy urine, but catheterization revealed no obstruction. The left testis was enlarged to about four times the normal size but was not painful upon palpation. The right testis apparently was not involved. By rectal examination it was found that the bladder was markedly distended; the walls were greatly thickened and firm. The left ductus deferens was about three times its normal size and could be palpated down to the inguinal ring, which apparently was compressing it. There was no rise in temperature, and the animal retained his appetite and vigor. No definite diagnosis was made at this time, but symptomatic treatment was advised, and a support was made for the enlarged testis.

The owner reported no change in the animal's condition during the following week, when he was again examined. At this time the testis was still enlarged and the scrotum was edematous. About 20 cc. of clear, straw-colored fluid was aspirated from the scrotum. Subsequent bacteriologic examination showed this to be sterile. The right testis was still apparently normal. The bladder, whose walls were still thick-

ened and firm, was found to be distended more than on the previous examination, hanging down over the pubis for a distance of about 40 centimeters. The left ductus deferens was still enlarged.

The owner reported that the stallion was making more frequent straining attempts to urinate but voided only small amounts of thick, yellowish urine. A catheter, passed with ease, liberated about two liters of thick, opaque urine from which a fine, clay-like, yellowish sediment settled out on standing. About five liters of water, pumped into the bladder through the catheter, came out with a great deal of yellowish, clay-like material in small clumps up to three millimeters in diameter, having the gross appearance and the feel of putty. This was subsequently found to be formed of crystals of calcium carbonate and calcium phosphate.

During the following ten days the symptoms became progressively worse. The edema of the scrotum extended from the left side to the right and anteriorly to the sheath, finally involving the entire under line forward to the area between the fore limbs. He became moribund and was destroyed.

The postmortem examination showed a marked edema of the under line extending anteriorly from the scrotum to the region between the fore limbs. The penis, which protruded about eight inches, was congested and edematous. Both seminal vesicles were enlarged and distended with fluid, measur-

\*Paper No. 1890, Scientific Journal Series, Minnesota Agricultural Experiment Station, University Farm, St. Paul.



ing about 25 centimeters long and 10 centimeters wide. The left seminal vesicle contained straw-colored, viscous fluid that had the odor of urine. There were shreds of fibrin on the wall of the organ and small deposits of clay-like material similar to that seen in the urine. The right seminal vesicle was filled with purulent material. Its walls were also thickened by a coat of fibrinous exudate. The left ductus deferens, about five centimeters in diameter, contained a straw-colored fluid that had the odor of urine. The right ductus deferens was normal except for the ampulla, which, like the left ampulla, was distended and contained a purulent exudate.

The bladder was displaced onto the floor of the abdomen and stretched so that there was no clear demarcation between the vesicle and the neck. It contained about 200 cc. of thick, viscous urine, containing shreds of fibrin, and large deposits of clay-like sediment especially on the lower walls. This material, of the consistency of putty, resembled the sediment from catheterized specimens of urine previously obtained. The walls of the bladder were firm and measured up to three centimeters in thickness. The urethra was distended to a diameter of about eight centimeters for a distance of about 20 centimeters beyond the bladder. The openings of each ductus deferens, the ducts of the seminal vesicles, and the prostate gland were apparently occluded by the deposit of fibrin.

Both ureters contained small amounts of the clay-like sediment and showed a fibrinous exudate which was patchy in distribution. Small amounts of this material were found in the pelves of both kidneys. There were small foci of necrosis visible in the cortex of each kidney. The prostate gland was apparently normal. On the left side, the scrotum contained approximately 100 cc. of clear, straw-colored material which resembled that previously aspirated. The testis was enlarged to about twice its normal size and was very firm. There were adhesions between the tunica communis and tunica propria. The right testis was apparently normal. The findings in the thorax were essentially negative.

Microscopic examination of the kidneys showed many small abscesses with necrosis of adjacent glomeruli and tubules. The ureters showed desquamation of epithelium with many pus cells in the deeper layers and purulent exudate in the lumina. The mucosa of the bladder was replaced by a dense infiltration of pus cells covered by a thick, fibrinous layer; the suppuration extended down through the muscle coat in some places. The walls of the seminal vesicles were invaded by leucocytes, and the mucosa was replaced by a suppurative exudate. The ampulla of the left vas deferens showed a chronic proliferative reaction with many mononuclear cells and lymphocytes in the mucosa. The left testicle had tags of organizing fibrin on the serous surface. At the periphery of the testis the tubules appeared to be normal and contained developing and mature spermatozoa, but toward the center the tubules were compressed, atrophic, and undergoing necrosis. These contained no spermatozoa. The right testicle showed the presence of connective tissue tags on the serous surface similar to those seen on the left testicle. The tubules were all normal.

Two other animals on this farm have suffered from cystic calculi during the past several years. We believe that in this stallion the primary disturbance was the deposition of large amounts of sediment in the bladder which became distended and atonic as a result of the cystitis. The seminal vesicles probably became distended with urine because of the pressure in the distended urethra near the neck of the bladder. The left ductus deferens may have become infected in a similar manner, since the left ampulla was found to contain urine. This probably occurred before the occlusion of their orifices by the fibrinous exudate in the urethra. There were no inflammatory changes within the testicle itself. The atrophy and necrosis of the tubules probably were due to the pressure caused by the edema and presence of fluid in the sac. This in turn may have been the result of interference of the venous return by the distended ductus deferens in the inguinal ring.

# Observation on a Case of Listerellosis in Sheep

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ON MARCH 6, 1940, an adult sheep was examined from a flock located near Dixon, California. This animal had sickened approximately twenty-four hours earlier. It was unable to stand and exhibited symptoms of paralysis. There was a thick

died. Affected animals exhibited symptoms of paralysis; they circled either right or left and later went down and were unable to stand. Affected animals died after approximately ten days of sickness. The ranch was visited later in March and a

## Animal Inoculations

| ANIMAL             | DATE    | MATERIAL                    | DOSE   | METHOD            | RESULTS   |
|--------------------|---------|-----------------------------|--------|-------------------|---|
| Rabbit No. 1       | 3/6/40  | Brain emulsion from sheep   | 1 cc.  | Subdurally        | Dead 3/7/40. Cultures staphylococcus and <i>Listerella monocytogenes</i>  |
| Rabbit No. 2       | 3/7/40  | Brain emulsion Rabbit No. 1 | ½ cc.  | Intravenously     | Died immediately  |
| Rabbit No. 3       | 3/7/40  | Brain emulsion Rabbit No. 1 | 1½ cc. | Intraperitoneally |   |
| Reinoculated No. 3 | 3/11/40 | Broth culture sheep         | ½ cc.  | Subdurally        | Died 3/12/40. Cultures from brain yielded <i>Listerella monocytogenes</i>   |
| Rabbit No. 4       | 3/9/40  | 24 hour broth culture       | 1 cc.  | Intravenously     | Died 3/16/40. Had been paralyzed for two days. Autopsy revealed small white areas on heart. Cultures from heart blood, liver, spleen, cerebrum and cerebellum were negative |

mucous discharge from the nostrils. The rectal temperature was 105.2° F.

## HISTORY

This animal came from a registered purebred flock of Hampshires raised on the ranch. One year before, bucks were imported from England. Some ram lambs were purchased in California. Additional yearly purchases are made at the California ram sale. Animals from this flock are shown at local fairs and some are sold each year at the ram sale.

According to the owner, the first case appeared approximately six weeks earlier. During this time two ewes and five bucks were affected. All of these animals, excepting the one brought to the laboratory,

letter was received April 11, 1940. During this time new cases had not developed.

An antiserum prepared against our strain 381-40 agglutinated the Schultz strain in a low dilution (1/50 to 1/100). The agglutination test with the homologous antigen was somewhat higher (1/400 to 1/800); however, the agglutination was not complete in these dilutions. Antisera prepared against the Schultz strain agglutinated strain 381-40 partially in a dilution of 1/25 while a similar test with its homologous antigen was complete in 1/800 and partial in 1/1600 and 1/3200 respectively. It would appear that strain 381-40 was, in our hands, a poor agglutinating strain and in a like manner, it failed to stimulate a high antibody titer for agglutination with the Schultz strain.

## AUTOPSY

The white blood cell count was 25,000. Examination of the digestive tract revealed *Trichostrongylus axei*, *Ostertagia circumcincta* and *Ostertagia trifurcata* in the stomach and *Chabertia ovina* in the large

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intestines. There were no lesions recognizable by macroscopic examination.

Sections from the cerebellum stained with hematoxylin and eosin showed subdural hemorrhages. Sections from the medulla showed a perivascular round cell infiltration with other areas of round cell infiltration throughout the brain structure.

#### CULTURAL EXAMINATION

Primary cultures were made upon beef infusion agar pH 7.2 to 7.3 on slants and upon similar agar plus normal rabbit blood on plates. All of these cultures were incubated aerobically. Cultures from the liver, lungs and spleen were negative. Agar cultures from the brain yielded cocci. Blood agar plates from the brain yielded a Gram-positive motile rod, which produced slight hemolysis. This organism formed acid in dextrose, maltose, lactose, sucrose, and dextrin. Acid was not formed in mannite, xylose, arabinose, starch, or dulcitol. Hydrogen sulfide was not formed. Gelatin was not liquefied. This culture is identified as 381-40.

#### COMMENT

The identification of an infection with *Listerella monocytogenes* in this instance is of interest, largely because of the fact that this infection has not been reported previously in domesticated animals in western United States. Schultz *et al.*<sup>2</sup> reported infection in a nurse with this organism in 1934 and confirmed the identity of the organism in 1938. They stated, "No *Listerella* infections in animals have thus far been reported on the Pacific Coast." Numerous cases of this disease have been reported in animals in eastern and central United States as well as in other countries. According to Graham, Hester and Levine<sup>3</sup> cases have not been reported west of the Mississippi valley. Paterson<sup>4</sup> in reviewing

the incidence of the disease according to species infected shows extreme versatility of the disease in susceptible hosts.

#### Foot Rot in Cows (= Infectious Pododermatitis)

This disease occurs in large herds where poor drainage permits liquid manure to collect. The subject of this report was a seven-year-old Guernsey affected with this trouble for about two weeks. The pulse, respirations and temperature were above normal. She was listless and did not eat. The left foot was hot, painful, swollen, and contained purulent tracts leading in the direction of the coffin joint.

The claw was amputated according to the method of W. J. Gibbons described in the July 1939 issue of *The Cornell Veterinarian*. The operation was performed outdoors in the standing position under local anesthesia without any restraint. Rather than to depend exclusively upon blocking the plantar nerves, the anesthetic was infiltrated around the entire circumference of the metacarpus. After the injected region was thoroughly massaged, the anesthesia was complete. Hemorrhage was controlled with a tourniquet. The owner held the cow's head with one hand and flexed the leg with the other, while the claw was sawed off with the obstetrical wire. The part of the third phalanx remaining was dissected out, all necrotic tissue removed, and the articulation curetted. The wound was dressed with equal parts of chlorinated lime and boric acid, and a compression bandage applied. The bandage was removed in 30 hours and thereafter the stump was treated daily with dressing powder. In three weeks the cow had recovered.—Chas. Haasjes, Shelby, Mich.

Between 1915 and 1936, the mortality from trichinosis in the United States was but 0.004 per 100,000. During these 21 years the average number of deaths was four per year, or 78 in all. These figures and the fact that all higher life is more or less parasitized (harmlessly) put new light on the trichina scarehead.

<sup>1</sup>Schultz, E. W., Terry, M. C., Brice, A. T., Jr., and Gebhardt, L. P. Bacteriological observations on a case of meningo-encephalitis. *Proc. Soc. Exper. Biol. and Med.* xxxi (1934), pp. 1021-1023.

<sup>2</sup>*Ibid.* *Listerella monocytogenes*. A cause of meningo-encephalitis in man. *Proc. Soc. Exper. Biol. and Med.* xxxviii (1938), pp. 605-608.

<sup>3</sup>Graham, R., Hester, H. R., and Levine, N. D. Studies on *Listerella*. II. Field outbreaks of listerellosis in sheep and cattle. *Cornell Vet.* xxx (1940), 1, pp. 97-111.

<sup>4</sup>Paterson, J. S. The present position regarding *Listerella monocytogenes* infection in animals and man. *Vet. Rec.* li (July 15, 1939), 28, pp. 873-876.



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# EDITORIAL

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## Selective Service for Veterinarians and Veterinary Students

THE MEDICAL and dental professions are awake to the harm that can be done to their civilian as well as to their military services by unmanaged selection of practitioners and students for training under the selective service act. Congress is being petitioned to aid the War Department in bringing the talent of such professions into its proper place in the Army, and to do so in such a manner as to prevent disruption of their needful service in civil life. The government is asked not to break up the work of these indispensable professions for no better purpose than to train physicians and dentists (as is now being done) as private soldiers instead of either leaving them at home to take care of the population or else giving them commissions in such rank and numbers as the organizers of our military set-up may deem suitable to the present and future procurement objectives.

These movements on the part of the medical and dental organizations, particularly the AMA and the ADA, are active ones. Meetings recently held in Chicago pointed out the need of conserving the civilian services as well as building up the military branch.

The thought conveyed by these timely resolutions has its counterpart in the veterinary profession, and as a consequence, the AVMA is fostering similar movements in its behalf and in behalf of a service which, probably more than any other, is essential to the preparedness program.

Dr. Fishbein, speaking at one of these meetings, drew attention to the famine and pestilence of wars and the vigil of physicians among the civilian population that is required to cope with them. Famine and pestilence is largely the child of broken-down livestock production which only a

properly managed and sufficient veterinary service can prevent. With this thought in mind President Wight is urging the continuation of the Association's effort to lend aid and advice to the War Department in this connection. The executive secretary has urged the officers of the constituent associations and others to cooperate in this effort.

At this moment it is imperative for all to keep in touch with the situation and, if possible, follow the requests for concerted work coming from the central office.

A bill, introduced in the Senate by Senator Murray, known as S. 783 is intended to set matters right as far as physicians and dentists are concerned. But it does not include veterinarians. Obviously, the importance of maintaining a qualified animal-disease-control service was overlooked. As a matter of fact, the province of the veterinary service in a great agricultural country like ours is not well enough known in the halls of Congress. To overcome this misunderstanding is what the AVMA has set out to do by urging the inclusion of veterinarians and veterinary students in this bill, the full text of which is printed below:

\* \* \* \*

### S. 783

A bill to amend the Selective Training and Service Act of 1940.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section 4 of the Selective Training and Service Act of 1940 is hereby amended by adding at the end thereof the following new subsection:

"(c) Any individual selected for training and service under this Act (1) who is a graduate of a medical school and is eligible as such a graduate for the examinations given by the National Board of Medical Examiners of

the United States, or who was so eligible at the time of his graduation, or who is a graduate of a school of dentistry, or holds a degree of doctor of dental surgery or doctor of dental medicine; and (2) who holds a valid license to practice medicine, surgery, or dentistry in any State, Territory, or possession of the United States, or the District of Columbia, and is engaged in such practice at the time of his selection; and (3) whose physical and mental fitness for such training and service has been satisfactorily determined, shall, in lieu of induction into the land or naval forces of the United States for such training and service, be commissioned an officer in the Medical Department Reserve, Officers' Reserve Corps, and ordered into the active military service of the United States, as provided in the joint resolution approved August 27, 1940."

SEC. 2. (a) Subsection (d) of section 5 of such Act is hereby amended by inserting "(1)" after "(d)" at the beginning thereof.

(b) Subsection (d) of section 5 of such Act is hereby further amended by adding at the end thereof the following new paragraph:

"(2) (A) Students who are preparing for the degree of doctor of medicine or bachelor of medicine at medical schools; (B) students who are preparing for the degree of doctor of dental surgery or doctor of dental medicine at dental schools; (C) hospital internes and resident physicians and surgeons who are graduates of medical schools and are eligible as such graduates for the examinations given by the National Board of Medical Examiners of the United States or were so eligible at the time of their graduation from such medical schools; (D) hospital dental internes and resident dentists who are graduates of schools of dentistry or hold degrees of doctor of dental surgery or doctor of dental medicine; and (E) teachers at medical and dental schools shall be exempt from training and service (but not from registration) under this Act. Notwithstanding any other provision of law, any such medical or dental student, hospital interne, or resident physician, surgeon, or dentist, or medical or dental-school teacher, who is a member of a reserve component of the land or naval forces of the United States, shall not be ordered or called to active duty or into active service in any of such forces, except in time of war."

SEC. 3. (a) The amendments to the Selective Training and Service Act of 1940, contained in the preceding sections of this Act shall be applicable as if they were a part of such Act of 1940 on the date of its enactment.

(b) Any person heretofore inducted into the land or naval forces of the United States for the training and service prescribed in the

Selective Training and Service Act of 1940 who comes within the provisions of the amendment to such Act of 1940, contained in the first section of this Act, shall be discharged from such forces and given a commission and ordered into the active military service of the United States, as provided in such amendment.

(c) Any person heretofore inducted into the land or naval forces of the United States for the training and service prescribed in the Selective Training and Service Act of 1940, who would have been exempt from such training and service if the amendment contained in subsection (b) of section 2 of this Act had been in effect at the time of such induction, shall, upon his own request, be immediately discharged from such forces and shall receive the travel allowance provided for in the case of enlisted men discharged from the Army, Navy, or Marine Corps by section 126 of the Act entitled "An Act for making further and more effectual provision for the national defense, and for other purposes," approved June 3, 1916, as amended.

(d) Any person ordered or called to active duty or into active service in the land or naval forces of the United States between August 26, 1940, and the date of the enactment of this Act, who would have been exempt from such active duty or active service if the amendment contained in subsection (b) of section 2 of this Act had been in effect at the time he was ordered or called to such active duty or active service, shall, upon his own request, immediately be relieved from such active duty or discharged from such active service and shall receive the travel allowance to which he would have been entitled if the period of active duty or active service for which he was ordered or called had been completed.

(e) Any person who is discharged, as provided in subsection (c) of this section, or is relieved from active duty or discharged from active service, as provided in subsection (d) of this section, shall be entitled to the benefits of section 8 of the Selective Training and Service Act of 1940 and subsections (a) to (d), inclusive, of section 3 of the joint resolution entitled "Joint Resolution to strengthen the common defense and to authorize the President to order members and units of reserve components and retired personnel of the Regular Army into active military service," approved August 27, 1940, as the case may be.

\* \* \* \*

The provisions contained in S.783, reprinted above from an official copy, were discussed at the 37th Annual Congress on Medical Education and Licensure convened

at the Palmer House in Chicago, February 17th. Medical leaders advocated the deferment outlined. Otherwise, it was argued, a competent medical service could not be maintained for either the armed forces or the civilian population.

#### SHOULD INCLUDE VETERINARIANS

The same blanket deferment for veterinarians and veterinary students is no less vital. There is no alternative in preventing the evils of livestock diseases which can quickly reduce the food supply to a dangerously low level—to the state of famine and pestilence emphasized by Dr. Fishbein. Congress must be so informed. The people expect such bodies as the AVMA to proffer advice concerning the functions of the veterinary service. A large armed force in the United States will always be made up, not of professional officers and soldiers, but of civilians hurriedly trained. The main duty of the skeleton army maintained in times of peace is training civilians to use their knowledge and their skill in the military way.

#### ARMIES OMNIFARIOUS

A peacetime population as represented in legislative bodies is apt to forget that an efficient military force calls for expertness in practically every human pursuit. No detail of animate and inanimate matériel can be logically expunged in the integration of an army. Successful commanders are keenly aware of that fact. When General Liggett took command of the troops in action in 1918, his first "General Orders" was a suggestion to officers to find out without delay what their soldiers had been trained for in civil life and to use them in that capacity if expedient. The order worked; his army won. The Selective Service Committee of the present time may well heed the order of this great American general. To him, putting men promptly in the right place was deemed imperative to his success. Certainly, in building up a military force while there is time to do the job well, the selection of men for their civilian training should be

objective No. 1. The medical, dental and veterinary professions are doing their duty in a large and important way when they draw attention to the wisdom of using their respective personnels to the best advantage.

#### Wars and Drug Manufacture

Search for substitutes for quinine, cod liver oil and digitalis has been stimulated by the present war. Coming respectively from the Dutch East Indies, Norway and England, importations have been curtailed. Though the shortage is not yet serious, the prospects are said to be disturbing to American purchasers, who may have to look to home production or substitutes in supplying demands. Each one of the great wars has stepped up American drug production. The first sodium sulfate (= Glauber's salt) was made in this country during the Revolutionary War. The Civil War is credited with having started American drug production toward the big business class, and the first World War gave us the gigantic drug- and chemical-producing industry of the present time. Indispensable pharmaceutical products once obtainable only in foreign countries are now competing on the world's markets. War, meaning necessity, mobilizes not only soldiers to fight them on battle fields, but also the scientists and engineers engaged in the discovery of indispensable matériel.

Although not so rated (as yet) diseases of domestic animals are agriculture's greatest problem and using veterinary science to the best advantage is its greatest obligation.

An important project of the profession is improving its public relations to such an extent that its place in national economics will be more generally understood.

The farmers, like the people as a whole, are little aware of what the control of animal diseases has accomplished for them.



## The Veterinary Science Factor in National Welfare

Since the very discovery of America, the prosperity enjoyed by its people was due to increase in the population plus the natural resources open to exploitation. The ratio of resources to the number of people was so favorable that there developed here the most prosperous nation of all times without the need of regulating individual effort. There were enough resources and people to let everything and everybody sink or swim under the laws of supply and demand. The weak sank and the strong swam but, as the resources were ample and *per capita* wealth rose beyond the fondest dream of any previous nation, the majority were content with their country's achievement. Yet, according to the studies of experts on populations and national vitality, there should be an increase of 70 to 80 per cent of supplies and services to give the American people an optimum standard of living,<sup>1</sup> compared with the more crowded countries. The "optimum" refers to provisioning the entire population with a liberal diet containing the proteins, vitamins and minerals required for adequate nutrition. As such a diet is obtainable only from domestic animals, the function of the veterinary service in the country's affairs is plainly mapped out, for in furnishing the quantity and quality of food the people should have, there can be no compromise with animal diseases. In fact, any degree of thoughtlessness in animal-disease control would quickly lower the standards of living and remove all hope of attaining the optimum diet set up by scientists as the minimum requirement of good health and enduring prosperity.

The most careful analyses that have been made of our population lead to the conviction that strengthening the federal and state veterinary forces, their policing and researches, and encouraging their allies in private practice and commercial projects, are national issues of the fundamental type. The task lying ahead is assisting animal

production to nourish a population of 132,000,000 that (according to estimates) will increase at the rate of five million a year during the next 40 years. Granted that more and better food *per capita* will be required, veterinary science will be a substantial factor in national development. The task of organized veterinary medicine is to see that our science is used to the best advantage. Antiscientific, subversive practices should be controlled as effectively as disease itself. Intelligent people will not forever tolerate the exploitation of their food supply through selfish interests seeking riches at the expense of public welfare, because the liberal diet (adequate nutrition) future populations will demand can not be supplied except through the operations of an efficient veterinary service. Animal production and animal health are inseparable companions.

## War Brings Out the Veterinarian's Province

Even in a country where domestic animals are not the main resources, it is evident that man's destiny hinges to no small extent upon the prosaic work of the veterinary service.

The National Association of Great Britain and Ireland obviously aware of this presumption has formed a Survey Committee delegated to study the whole field of preventive veterinary medicine and to recommend sound policies on animal health "to the nation's profit" as the *Veterinary Record*<sup>1</sup> remarks editorially in commenting upon a report already submitted on diseases of cattle. While there is no intention on the part of the Committee to underestimate animal diseases communicable to man, its work, the editor goes on to say, is to be "essentially veterinary in origin and outlook," since the task of the veterinary profession concerns mainly the food supply. Preliminary plans have been drafted (quoting) "to the end that we may make a real

<sup>1</sup>Editorial, Journal of the American Medical Association, Dec. 28, 1940, p. 2282.

<sup>1</sup>Editorial. Animal Health. The Veterinary Record, lili (Jan. 4, 1941), p. 14.

contribution in this hour of the nation's need—and after."

Touching upon the same general subject, the *Veterinary Journal*<sup>2</sup> remarks that "the veterinary profession has an important part to play in the national effort to increase the supply of food. . . . We can anticipate changes in 1941 and we are confident the profession will play its part in the nation's effort."

It is gratifying to note that the Parliament is taking a lively interest in the work of this committee and that, as the editor states, the agricultural press is wisely advocating closer coöperation between the farmers and the veterinary service, which is a reform no nation can afford to treat lightly, least of all its farmers.

We compliment our British colleagues in the progress made toward bringing public attention to what they are doing in behalf of their country, as a general understanding of the veterinarian's province is none too clear anywhere in the world.

### Veterinary Military Service

Veterinary officers entering the Army for the first time will meet branches of study not contained in their college training: tactics, field service, military law, map reading, training of officers and men, administration, science of transport (logistics), disease prevention, evacuation and hospitalization, details of food and forage inspection, and other subjects foreign to their college work. Special training is now provided.

Veterinary officers of World War I lacked training and trainers and were further handicapped by the absence of regulations to guide them and their commanders. The A.E.F. was fighting in France long before a veterinary corps was established. The expedition had to frame regulations of its own to meet the emergencies of each moment. All of this now lies in the forgotten past. The problem now is to overcome the popular idea that animals are not needed in the army, and to win public confidence through expertness in food inspection.

<sup>2</sup>Editorial. The Passing Year. The Veterinary Journal, xcvi (Dec. 1940), p. 426.

### The Purebred Livestock of Europe

The loss of fine lines of purebred livestock is mentioned in current dispatches as one of the misfortunes of World War II. The home of the Percheron has been bombed beyond redemption, one livestock paper declares. The Jersey Islands, source of the famous breed of dairy cows, are no more. The Channel Islands, where dairymen go for Guernseys, lack the forage needed to carry on as the cradle of their favorite types. Normandy, domain of centuries for the breeding of dual-purpose cows, is in the throes of military occupation and air raids. The fine breeds of the Low Countries have been sacrificed on account of insufficient roughage. Breeds of hogs, sheep, cattle, horses, selectively bred for years to create suitable strains, are said to have vanished to a considerable extent. Dogs have become forbidden property in several of the belligerent countries according to numerous reports trickling through the censors. And, the end is not in sight.

The bright side of this lurid picture is the zootechnics-minded European whose statesmen are more aware of the omnipotence of domestic animals in national security than ours might be under similar circumstances. It is not believable that even war would divert the Europeans away from their only hope of survival. They know livestock and they know their virtue, through centuries of experience we are yet to understand. It is, therefore, logical to connote that when the smoke of war has cleared away, the European nations will not have as completely demolished their most precious possession—their purebred livestock—as the dispatches seem to indicate; and furthermore, that the manufacture of the actual implements of modern warfare and the war itself have not superseded the preservation of the purebreds to a great degree. Wisdom, born of experience, forbids. Notwithstanding that the destruction of human needs in war can get beyond control, it is not likely that Euro-

peans have reached that level of prostration.

In this country where we tussle with surpluses rather than a shortage of farm products, it is understandable why the industries get all the headlines and livestock are never mentioned in the preparation for national defense. *Outre mer*, where zootechnics as well as animal health are major projects of the national curriculum, far beyond the American's comprehension, animal production is not apt to be neglected or wantonly sacrificed. One may well question reports to the effect that the fine livestock of Continental Europe will be allowed to perish from the earth, since domestic animals are not discounted by experts on military necessities.

### Medical Advertising

The ethical doctors of Salina County, Kansas, run paid advertisements in the local newspapers telling the achievements of the medical profession in regard to its victories over the more common contagions to which mankind is constantly exposed. Carefully phrased advertisements said to be approved by organized medicine are used. The object, reports say, is to end years of silence which have led to the birth and growth of preposterous isms and cults which thrive on public ignorance.

The step contains a suggestion for groups of veterinarians who are torn between the desire to obey the established code of ethics and the need of advertising their enterprise.

### Where Do We Go from Here?

The veterinary services as organized in the world of today began with the founding of veterinary colleges in the last half of the 18th century. The birthplace was France and the exact date 1761 when the first one of such colleges was started on its way. It is a good date to keep in mind, for what has occurred since then is the chain of events which led to the forming of the veterinary profession we know.

From Hammarubi to Moses was eight centuries, and from Moses to Louis XV

was 31 centuries. It is logical to conclude that the historic livestock regulations of the Assyrian kings were the precursor of the famous Mosaic laws of health for man and animals. But this was 14 centuries before our era. After Moses is the gap of many centuries (31 of them) which saw the ascendancy of Greece, the raids of Alexander the Great, the rise and fall of Rome, and the painful centuries of the Renaissance which led to the reestablishment of medical education and the founding of veterinary schools and regulatory services governing the control of animal disease and systematic breeding of the farm animals required for transportation and food for the increasing populations. To be remembered is the historical fact that nothing much of the ancient's knowledge of animal medicine was preserved. In a world weakened by centuries of international strife, comparable with the situation today, only the Arabs preserved it.

Modern veterinary medicine is, therefore, not the child of the ancients. It is the offering of the necessity of increasing animal production in a world striving to put civilization in order. The Renaissance of the post-medieval period was also the renaissance of veterinary medicine. In passing, however, one should credit Vegetius, talented Roman veterinarian (450 A.D.) for his teachings on livestock sanitation as a means of "conserving property for the state." (*Vide, Veterinary Military History.*)

The study of veterinary medical progress in modern times among the English speaking nations takes one from France (1761) to England (1791) to Scotland (1823) to Canada (1862) to the AVMA (1863) to New York (1875) to Iowa (1879) to Chicago (1883) to the founding of the U. S. Bureau of Animal Industry (1884) to the closing of private veterinary schools (1920).

The events of the past 20 years are too near for historical analysis. They are, however, years which led to excellent educational systems, numerous research laboratories and national associations in England and the United States which now



contribute abundantly to the security of these countries.

"Where do we go from here?" depends upon the kind of conduct that brought us where we are—conduct characterized by scientific achievement, professional devotion, honor, unselfishness, and the absence of subversive programs.

### Penalty for "Absent Veterinary Service"

States which neglect the control of animal disease are sooner or later shocked into the realization that disease is a costly guest. The outbreaks of anthrax in South Dakota, the embarrassing incidence of dourine in Arizona and the threat of erysipelas to the Cornbelt are warnings against the *laissez faire* attitude of state governments toward the sensible and scientific handling of livestock disease. Quackery on the one hand and indifference on the other are outmoded at this day of national effort to maintain the degree of security against preventable catastrophes afforded by systematic supervision of animal diseases. It is becoming more and more apparent that the United States can not afford to replace the methods of scientific veterinary medicine with dubious programs, nor go on trusting to luck, hoping that diseases of our livestock will be thoughtful enough to take a long vacation.

The Division of Marketing and Marketing Agreements of the federal department of agriculture held, a short time ago, a referendum by mail among milk producers of the Chicago area on the handling of milk in Chicago. The object was to make adjustment in producer prices and in the classification of milk.

The ramifications of veterinary science extend with but rare exception into all of the agricultural projects: production, manufacture, sale and utilization of plants and animals.

### Hoosier Veterinarians Preparing to Entertain AVMA, August 11-15

INDIANAPOLIS, scene of the 78th annual convention of the American Veterinary Medical Association, to be held August 11-15, is a typical American city covering 55 square miles. It has a population of more than 400,000. It is to this city that Hoosier veterinarians have invited their professional colleagues to take part in the "World's Largest Veterinary Convention."

Practitioners in Indiana are proud of the fact that it is their job to look after a livestock industry composed of 457,000 horses, 1,633,000 head of cattle, 3,405,000 hogs, 920,000 sheep, 16,029,000 fowls and an undetermined number of household pets.

The Indianapolis Stock Yards cover 200 acres and have a daily capacity of 30,000 head. Meat-packing and slaughtering concerns annually turn out products valued at approximately \$100,000,000.

Between business sessions of the convention, veterinarians and their families will be attracted to the world's most famous motor speedway, located in Indianapolis. Here are held the famed automobile races which draw racing fans from all parts of the globe.

Many of the visitors to the annual meeting will be interested in the city's industrial plants. Indianapolis houses the world's largest exclusive paper shopping bag factory, one of the largest stoker and commercial refrigerator factories, the largest cotton glove factory, inner tube factory, and one of the largest food producing plants in the country.

Veterinarians will be especially interested in pharmaceutical and biological plants located in Indianapolis devoted to veterinary items. An immense plant which manufactures pharmaceutical and biological products for human use also is situated in this city.

## *Places You'll Be Seeing August 11-15*

At left is the Murat Theater and Shrine Temple of Indianapolis. This building will be headquarters of the 78th annual session. Below is an airview of downtown Indianapolis.



Lower left: Partial view of the World War Memorial Plaza, showing Obelisk Square in the foreground. American Legion national headquarters are situated in distant left corner of Plaza, Indianapolis Public Library in distant center. Lower right: Indiana state capitol building.



*Plan Now to Visit Indianapolis and the  
"World's Largest Veterinary Convention"*

## Robert von Ostertag

(1864-1940)

*Grüss Sie Gott* Ostertag, expresses the emotion felt throughout the world of veterinary science when the late announcement of his death arrived from German colleagues. Although he passed away on October 7, 1940, the news was slow in reaching this office. A dispatch from John R. Mohler received as the JOURNAL was in the



Robert von Ostertag

hands of the printer enabled us to mention the news briefly in the February issue (p. 174).

Professor Ostertag, who was an honorary member of the Association, ranks among the most prominent

veterinarians of all times. Known as the father of modern meat and milk inspection, Ostertag was a contemporary of great men of medical and veterinary science whose names, like his own, are indelibly inscribed in the *livre d'or* of modern science. He won acclaim, throughout the world of science and economics, particularly for the knowledge he possessed and gave out abundantly in classical books and current literature through many years. His journal of meat and milk inspection and his manual of meat inspection, which was translated in many languages, leave a rich heritage to the world he served so long and so well. He lived with and close to Virchow, Billroth, von Behring, Koch, Deckerhoff, Frohner, Freidberger, Ehrlich, and other distinguished figures of medical and veterinary history, and belongs with them in the hall of famous men.

Ostertag was a typical specimen of his race, a mental and physical giant, with a modest, hail hearty-and-well-met personality that stood out from the crowd in any gathering. In America we are thankful for his aid in developing our meat-inspection system at the turn of the century and

for his honored contributions to that field up to the time of his death. As a participant in the Twelfth International Veterinary Congress (New York, 1934) he will long be remembered, not so much as a distinguished visitor to our country, but as a man whose work we venerate and understand. Our *Wie geht es Ihnen* on that memorable occasion was spoken as if we had known him always.

With the passing of von Ostertag the veterinary profession loses a master mind. *Auf Wiedersehen.*

## The Thought Has Lived

At the annual meeting of the Illinois State Veterinary Medical Association, held at the Sherman Hotel in Chicago, November 17-18, 1892, President S. S. Baker, brother of the better known A. H. Baker, said in his presidential address:

I would also urge upon you to join the United States Veterinary Medical Association, thereby assisting to make that body a truly national one. The state associations can only hope to have a local influence but the U.S.V.M.A. is bound to wield an influence that will be felt throughout the length and breadth of the land. I think it is only a question of time when it will be a requisite condition to qualify a man to become a member of that body that he be a member in good standing in a state association.

In 1941, or 49 years later, we are still nursing the identical idea set down by a leader among the practitioners of his day who envisaged the importance of an improved nationalism for his colleagues. In 1892, the national association was struggling to increase the course of instruction in the veterinary schools from two to three years as the minimum requirement for admission to membership, the federal bureau of animal industry was tusseling with the cattle-tick and hog-cholera problems, and practitioners were flocking to state legislatures trying to enact laws governing veterinary practice. Sensing the significance of these projects, President Baker urged his colleagues in practice to step in and help. None could write a better speech today on promotional work.



# WITH THE EDITORS

## Re: "'Hoss' Doctor"

Unaware of the pitfalls of writing books, the authors of the popular book, "Hoss" Doctor, *père et fils*, believe, and we think sincerely, that the JOURNAL was not fair in its review of their work. Objection is raised to pointing out technical errors for which *fils* takes all the blame. It seems that *père* talked as *fils* wrote and thus a busy general practitioner of rural Massachusetts told a story of his life that caught the ear of the congregation and the stride of bookdom at the same time, for, no sooner was the type dry 'til the flowers and the brickbats began to fly—the flowers for a story well told and brickbats for the prosaic title. In the review, printed in the form of an editorial as a compliment to the authors, no harm was intended and none was done. As we speak only to a veterinary audience, readers of the book might well have wondered whether it had been read at all, had the technical errors not have been declared. Pointing out that "strops" are not the cause of canine distemper and that calcemia is not a disease would not stop any veterinarian from going to the bookstore to buy a copy.

The only addendum to the review we can think of is that we wish both father and son a handsome return for their undertaking and, if not presumptuous, to thank them in behalf of the profession for writing a book on the life of a general practitioner that won nationwide attention.

## Cats

Elsewhere in this issue is an article on cats by Glenn Ebright of Hammond, Indiana, who, like Tucker and Carpenter (also of Indiana) on poultry practice, tells his colleagues what they are missing by not taking more interest in the feline branch of veterinary medicine.

The cat is not only a fine and economical pet but is also a mighty useful farm animal.

The biggest rat has quite a lot of respect for the farm cat and the crop of mice on a farm is kept down to a low level by cats that are not too well fed. Of all the domestic animals, the cat has the fewest faults and is perhaps the least appreciated.

## Unfetter the Veterinary Service

The article "Veterinary Service of a State" by W. J. Butler, state veterinary surgeon and executive officer of Montana (J.A.V.M.A., February 1941, pp. 103-109) treats of a fundamentally important subject to keep in mind through coming years of association work. If this carefully prepared article does not arouse interest or lead the state societies to take the steps required to bring about the reforms pointed out, the desuetude will be unfortunate.

One of the main thoughts laid bare is the operation of the veterinary service as an independent unit of the state code and the direction of it by a qualified veterinarian selected out of politics by a livestock commission not easily changed. Another reform of particular interest to the rank and file is the use of district and resident deputies (veterinarians) in livestock sanitary work.

Whereas such reforms may be quite difficult to accomplish in many states, they are steps to keep prominently in the foreground of the profession's platform. As state governments become more economical and more efficient, the veterinary profession should be ready to propose the right steps to be taken in its field. The legislative committees of our constituent societies will find this article a useful guide in initiating measures for the improvement of the service. Although the obstacles are admittedly great, they are not insurmountable, if the task of removing them becomes a popular issue of organized veterinary medicine.

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# READERS SAY

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To the Editor:

I am finally getting around to let you know that W. F. Guard, Ohio State University, attended our recent Tennessee Veterinary Medical Association meeting and gave us a fine lecture which helped to make the meeting a great success.

His subject [surgery] was popular with the practitioners and I am certain he gave them some valuable pointers and food for thought. All agree he did not have enough time but it seems to me that good discussions always suffer for lack of time at all meetings. . . . We think you made a good selection in offering the services of Dr. Guard and we are very thankful to the AVMA for sending him.

D. COUGHLIN,  
*Past President, Knoxville, Tenn.*

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## Suggests BAI Control of Distemper

To the Editor:

Your efforts to control canine distemper have been appreciated. Because of your position I feel that you are best able to furnish the information we need. In the past 20 years much has been accomplished in the prevention of distemper but in most cities there are pet shops, humane organizations and dog pounds whose places are contaminated with distemper virus. If the spread of the disease stopped here there would be no reason to complain, but the dogs exposed in these places are scattered all over the city. Perhaps, little hearts are broken when their highly prized pets contract distemper from a pup brought in from one of these infected places. Some of these organizations are directed by incompetent men who ignore all of the scientific facts involved.

What would be the best procedure to follow in order to get some degree of control over these places? Certainly, for the good of their pets, owners should insist that

those in charge should be licensed veterinarians trained in this field. Would it not be possible to have the control of distemper placed in the hands of the U. S. Bureau of Animal Industry?

H. E. VIERGUTZ,  
*Detroit, Mich.*

[Dog pounds, dog refuges, pet shops, public kennels, etc., and their disease problems are so local in kind that federal interference with their operation is not possible under existing laws. Moreover, as we interpret opinions expressed on the status of the dog in the legal sense, the federal laws regulating animal diseases do not apply to that species of livestock. To accomplish the reform Dr. Viergutz suggests, new laws would have to be enacted, even in regard to interstate transportation.]

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To the Editor:

In my recent article on acaprin for piroplasmosis<sup>1</sup> I was made to say that I used two-ounce doses of trypan blue when I intended to say two grams of a two per cent solution. I have also had inquiries as to where acaprin can be procured. The product I used was obtained from Winthrop Chemical Company.

G. A. ROBERTS,  
*Ciudad Trujillo, Dominican Republic.*

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To the Editor:

*Science News Letter* (Dec. 21) mentions a muscle-splitting operation in which bands of diseased tissue within muscles are removed to rehabilitate useless muscles of infantile paralysis victims. Could this operation be practiced in race horses?—T. A., *New York.*

[We know of no state of paralysis in animals that would be regarded as an indication for such an operation.]

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<sup>1</sup>J.A.V.M.A., December 1940, pp. 599-600.

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# CURRENT LITERATURE

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## ABSTRACTS

### Glanders in Army Horses

Though rare at Army stations in the States, outbreaks at foreign stations are quite frequent. Many cases occur in China. It is rumored that among the animals of the contending armies in China many of them have been lost through the spread of glanders.

The author describes two cases in U. S. Army horses contracted through some unknown contact with outside animals. One horse showing a slight mucous, nasal discharge, depression and a rise of temperature gave negative results to the mallein test but eight days later broke out with cutaneous glanders which was confirmed by recovery of the specific organism. Another case, developed among the contact horses, was detected by taking temperature readings in the exposed animals. The author discusses the negative reaction to the intradermal test when the attack is acute and virulent. [*Dildine, S.C. Glanders in Army Horses. Veterinary Corps Bulletin, U. S. Army, xxxiii (1939), p. 38.*]

### Present Status of Rabies Vaccination

Largely on account of a better knowledge of neurotropic virus diseases the interest of laboratory workers in rabies has increased during the past five years. Improvements have been made in assaying rabies vaccines and more information has been obtained on the incidence of rabies in a community, through the use of the mouse diagnostic test. Leach in Alabama and Sellers in Georgia found that 11 per cent of the specimens negative for Negri bodies were positive to the mouse test and of 447 dogs found dead on the street or

in homes and not suspected as rabid, 5.2 per cent harbored rabies virus.

With respect to rabies vaccine, recent studies disclosed that the immunizing potency was meager regardless of its source. The need of some quantitative potency test was plain. This was developed at the Rockefeller Institute by (1) testing the virulence of a given preparation by injecting mice intracerebrally and (2) by measuring its immunizing potency in m.l.d. by vaccinating mice with the material and testing them three weeks later with graded doses of virulent virus.

The test showed that commercial vaccines containing virulent virus possessed considerable immunizing value, while non-virulent phenolized vaccines for human or animal use failed to immunize mice. Non-virulent chloroformized vaccines in twice the recommended dose, however, immunized mice regularly. Checked on dogs, the mouse test was found to give the same results. That is, phenolized vaccines found to be negative in mice were likewise negative in dogs injected in the neck with a Negri body-producing, dog passage, virulent rabies virus. Chloroformized vaccine doubtful in mice was also doubtful in dogs, but larger doses although irritant were effective in both mice and dogs.

Wyckoff and Beck of the Lederle Laboratories and Habel of the U. S. Public Health Service regard the mouse test as a reliable method of evaluating rabies vaccines. The latter regards the improvement of rabies vaccines basically important and mentions the steps necessary to accomplish that end. Moderate success was obtained in immunizing mice with chick embryo allantoic and chick embryo brain virus.

Because laboratory-induced variants of rabies are not unknown, no virulent vac-



cine, modified or unmodified, should be considered for mass vaccination until all efforts to produce a non-virulent vaccine have failed. The possibly harmful consequences of injecting virulent virus into the dog population must be considered. The author discusses attenuation with ultra-violet rays and formalin and concludes that his work thus far shows that there is now available a practical method of measuring the immunizing potency of rabies vaccines which might be used to standardize them and that it is encouraging that several groups are developing and testing new preparations which may make immunization against rabies a "definite possibility." [Leslie T. Webster, M.D., F.A.P.H.A., Rockefeller Institute for Medical Research, New York. *American Journal of Public Health*, xxxi (Jan. 1941), pp. 57-59.]

### Amputation of the Teat in Cows

Owners frequently request practitioners to remove a portion of a cow's teat, especially when home treatment for garget has failed. Some clients are of the opinion that this is the most economical treatment regardless of the deformity produced. Repeated visits are avoided as the operation insures good drainage of the quarter and shortens the period of illness. Moreover, three quarters will give about as much milk as four. With the aid of a nose lead and a cow-leg chain, the operation can be performed in the standing position.

As cows resent several pricks of the hypodermic needle and a solution does not infiltrate well in teat tissue, an ethyl chloride spray is used instead. After preparing the teat in the usual manner, a strong hemostatic tape is applied tightly well above the line of cleavage.

The teat is amputated at one stroke or two a half inch below the tape ligature. If the blade is sharp it is seldom necessary to make more than two cuts. The tape is loosened slightly and the purulent discharge is caught in a vessel containing an antiseptic solution. After irrigating the quarter with a syringe, the tape is tightened to hold the hemorrhage; in five to six hours it is re-

moved. Should the wound bleed, it may be reapplied and left on for a few hours longer. [Elam, C. W., M.R.C.V.S., D.V.M., *Amputation of the Teat of Cattle. The Veterinary Journal*, xvi (Dec. 1940), pp. 454-455.]

### Goat's Milk: A Profound Wonder

The nomads of the ancient era did not need medical kits, for with goats to supply milk, butter and cheese (and meat also) and sheep to furnish wool for clothing and meat for the rolling kitchen, the herb-hunting medicine man had much less to do because of the disease-preventive properties of a dietary rich in germicidal chlorides and life-sustaining potassium. Modern medicine refuses to credit the therapeutic virtues of the goat's milk they toted along with the commissary.

The ancient took his medicine with his food but did not know it. Only the Great Physician knew that the milk of the goat contained ingredients not present in the milk of the cow or human mother, and He extolled its virtues in the literature that was to become the Bible we read: "Thou shalt have goat's milk enough for thy food, for the food of thy household, and for the maintenance of thy maidens." *Vide*, Proverbs, xxvii:27. [A. Dubois Freeman, *Goat's Milk a Profound Wonder. The Goat World*, xxv (Oct. 1940), p. 10.]

### The Elimination of Tuberculosis in Livestock

When the eradication of bovine tuberculosis began in 1917, the federal meat inspectors condemned 40,746 cattle carcasses that year compared with but 1,693 carcasses in all plants in the United States in 1940, or 0.43 per cent for 1917 and but 0.017 per cent for 1940.

The greatest accomplishment connected with this work was the reduction of non-pulmonary tuberculosis in children. The mortality from that type of tuberculosis is but one-fourth of what it was prior to 1917. In terms of dollars and cents, this was purchasing human health at a low

price. [The tremendous economic gain to the cattle industry has been so often told that it needs no further reiteration here.] A repercussion of the campaign was disclosing the significant fact that a large proportion of the tuberculous hogs retained by the meat-inspection service was due to the high incidence of tuberculous infection in chickens in definitely circumscribed areas of the East Central and North Central States where, contrary to the custom in the East, old chickens were not disposed of at the end of the first laying year. Few chickens (about 1 per cent) under 18 months old react to the tuberculin test whereas 10 per cent of the older ones react. These facts, which were but one of the outgrowths of bovine tuberculosis eradication, paved the way for practical measures of control of the disease in poultry. It is neither practical nor necessary to test all poultry as was done in cattle. Only breeding stock held over to supply the hatcherymen's demands need be tested to eliminate the infected birds, and as they comprised but 10 per cent of the flocks, this precaution and disposal of the layers after the first year is the sum total of the measures required to bring avian tuberculosis under control. [Smith, H. B. *The Elimination of Tuberculosis in Livestock*. Hoard's Dairyman, lxxxii (Dec. 1940), p. 631.]

### Incubator Hygiene

The chick incubator is an ideal home for microorganisms. It has the heat, the humidity, and the shelter required for the exuberant growth of the bacteria brought in by the eggs and chicks hatched from them. If not properly cleansed and disinfected, the chick incubator spreads disease from one hatch to the next. The dust, down, egg-shell residue, and dead chicks are prolific sources of infections. No amount of fumigation during the hatch can prevent incubator contamination. Thorough disinfection after each hatch is mandatory. The cleansing process includes removing all dirt and debris, scrubbing with hot soapy water, washing with cresol and fumigating with formaldehyde, according to approved methods of generating that

gas. [H. V. Chamberlain, B.V.Sc., R.D.A., *Chicken Diseases and the Incubator—Why the Incubator Should be Fumigated*. Journal of the Department of Agriculture of South Australia, xliv (Sept. 1940), pp. 75-76.]

## BOOK NOTICES

### Photodynamic Action and Diseases Caused by Light

Chemistry and physics are creeping so rapidly into medical science that the most learned specialist is overwhelmed by the extent and the depths of their revelations in his own narrow field. In fact, medicine is becoming but a study of chemical and physical processes—an understanding of the chemical exchanges and their dynamics, judging from the progress set down in books coming from the laboratories of these sciences for application to the etiology and treatment of morbid processes. Diseases caused by light take the student of medicine into a new and untilled domain as delicate to reactions as the photographic plate.

While photodynamics is a very old study and its rapport with disease has engaged the attention of medical practice since antiquity, the two were only recently associated on a scientific background. Researches in physiology and chemistry brought them into harmonious juxtaposition in the medical curriculum along with cosmographic studies formerly foreign to orthodox medical science. The *rapprochement* which led to the writing of this book came about when the Americans were delegated to produce and publish scientific and technological monographs on chemical subjects at the Interallied Conference of Pure and Applied Science which met in England and Belgium immediately following the World War (July, 1919). The American Chemical Society and the National Research Council consented to undertake these two tasks. These societies appointed editors to select capable authors to write monographs on topics of current interest

which would tend to acquaint chemists in general with details of fields other than their own as well as to promote research in the particular subject.

Part I, in three chapters, contains (1) a graphic historical introduction, (2) the nature of radiation and its effects, and (3) general biological effects of radiation.

Part II, in eight chapters, entitled "Photodynamic Action," is a forum for the expert chemist and physicist which the ordinary reviewer will be pardoned for leaving severely alone in the rôle of critic, although throughout the material leads gradually to a better understanding of the chapters on photopathology which follow and which are, in fact, the meat of the author's discussion.

Part III on "Diseases Produced by Light in Domestic Animals" is a delightful treatment of a subject of unusual interest in veterinary science and practice. The historical discussion dating from 1776 down to the work of Marsh and Clawson (1930)<sup>1</sup> shows that the subject of light in veterinary medicine is not new. Numerous authors between these dates are cited to emphasize the action (photosensitization) of light on the white skin, or white parts of the skin of animals. Besides a general and extensive treatment of this subject, there are special chapters on the common dermatitis caused in white-skinned animals by the eating of St. Johnswort (*Hypericum*), buckwheat (*Fagopyrum*), and the various plants that cause yellow thick head (geel-dikkop), a serious disease of sheep in South Africa. The work of Sheard, Caylor and Schlotthauer,<sup>2</sup> who were unable to produce fagopyrism with a quartz-mercury arc, is cited to confirm the work of others that sunlight is effective through window glass.

The three chapters on (1) hypericism or St. Johnswort poisoning, (2) yellow thick head of white sheep, known also as geel-dikkop, and (3) fagopyrism or buckwheat poisoning, enrich the knowledge of veterinary medicine and obviously clarify (or

complicate) the relation of feed to disease.

Part IV on "Diseases Produced by Light in Man" covers such important matters as sunburn, urticaria solare, skin cancer; and photosensitization by porphyrins, by substances taken internally, by substances coming in contact with the skin, and other diseases attributed to the action of light.

This book is a classic, a pleasure to read and to analyze critically from the standpoint of common knowledge of medicine and obviously a great treat to the profound student of pathology not commonly contained in medical texts. [*Photodynamic Action and Diseases Caused by Light*. By Harold Francis Blum, Ph.D., Washington Biophysical Institute, formerly Associate Professor of Physiology, University of California Medical School. Price \$6.00. Pp. 308. Cloth. Rheinhold Publishing Corporation, 330 West 42nd Street, New York. 1941.]

### Public Administration Organizations

This book is a directory of the voluntary unofficial organizations in the field of public administration in the United States, societies which impinge upon or affect the public welfare. Such societies, of which the AVMA and the USLSSA are understandable examples, cover a wide range of important jurisdictions which, in fact, provide the United States with exceedingly valuable public services. They are voluntary coöperatives of central governments—substitutes of the centralized authority of non-democratic countries.

The number of national societies catalogued is 556 of which 217 are classified as professional and technical, 233 as citizens' organizations and 106 as bodies of officials and administrators. The authors do not claim that the directory is complete. Societies that are not what they pretend to be are excluded and excellent ones may have been omitted because the task of gathering the necessary information is tremendous. In some instances it is difficult to obtain. Many societies are built around a profession engaged in some phase of public service [*e. g.* AVMA] and since a considerable proportion of their members

<sup>1</sup>Marsh, C. D. and Clawson, A. B., U. S. Department of Agriculture, Technical Bulletin, 202, 1930.

<sup>2</sup>Sheard, C., Caylor, H. D., and Schlotthauer, C., Journal of Experimental Medicine, xvii (1928), p. 1013.



are publicly employed, they are, in effect, governmental agencies carrying voluntary assumed obligations. Others are citizen organizations important in various fields of public activity. Intentionally omitted are political, labor, trade, business, and religious groups; lodges, fraternal societies, business men's clubs, philanthropic foundations, institutes and bureaus connected with universities and colleges, and local organizations less than state-wide. Among the "national organizations" those including Canadian members are catalogued under that name.

The descriptions of these societies comprise: name, age, address, eligibility and number of members, dues, purposes, publications, affiliations, financing.

The publication of this useful book is financed by special grants. The publishers make no appeal for membership or contributions, avoid competing with other directories, and have no political objectives or plans to promote other than that of exchanging knowledge and experience useful in public administration. [*Public Administration Organizations—A Directory. By a Board of Trustees, Frank O. Lowden, chairman. Edited by Louis Brownslow, director; Herbert Emmerich, associate director; and Robert M. Paige, assistant director. Price \$1.50. Pp. 187. Cloth. Public Administration Clearing House, 1313 East 60th Street, Chicago, Ill. 1941.*]

### Los Angeles County Livestock Department—Annual Report

Once a year there comes from the Pacific Coast a precious booklet summarizing the work carried out by the veterinary service of Los Angeles county under the direction of L. M. Hurt, county livestock inspector, who has a large staff of veterinarians under his command. The report for 1940 like its predecessors gives a clear picture of the many veterinary problems of a large county and metropolitan population bent upon maintaining the kind of livestock sanitary policing every community needs. Dr. Hurt's staff inspected during the year 444,842 head of stock as follows:

|                   |         |
|-------------------|---------|
| Beef cattle ..... | 102,919 |
| Dairy cows .....  | 19,227  |
| Sheep .....       | 305,927 |
| Hogs .....        | 16,969  |

A wide range of serious diseases is covered by these inspections. For cattle it includes anthrax, blackleg, anaplasmosis, necrotic enteritis, actinomycosis, calf diphtheria, paratyphoid, ringworm, shipping accidents, injuries from poisonous plants, rabies and other diseases; for sheep, brucellosis, stomach worms, coccidiosis, tetanus, *et al*; for horses, strangles and influenza, dourine, encephalomyelitis; for hogs, cholera, salmonellosis, gastroenteritis, "three day disease," tetanus, worm parasites, photosensitization, erysipelas, and the disease potential in garbage feeding; for poultry, fowl pox, pullorum disease, coccidiosis, worm parasites, tuberculosis, cholera, blackhead, deficiency diseases, catarrhal enteritis, and miscellaneous troubles. Other animals of the county handled by the veterinary staff included the rabbit, fox, mink, chinchilla and guinea pig.

The annual documentation of Dr. Hurt's labors contains a wealth of statistical material that is more than of local interest and the general plan of operating a community service of that type is history-making in the annals of veterinary medicine. [*Los Angeles County Livestock Department—Annual Report for 1939-1940. Paper-bound multigram. Pp. 56. Edited by Leslie M. Hurt, D.V.M., B.S.Agr., County Livestock Inspector, Los Angeles, Calif.*]

The most densely motorized spot in the world is the metropolitan area of Los Angeles—one auto for every 2.8 persons.—*Science Digest.*

The sale of evaporated milk increased nearly 150 per cent since 1920 and the price decreased almost one half during that 20-year period. Unfettered by sanitary restriction to the same extent as raw or pasteurized milk, and by the costly distribution evaporated milk has these advantages on the open market.

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# THE NEWS

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## *AVMA Activities*

### **Call for Volunteer Papers for Indianapolis Session**

Members are invited to offer papers for the sectional programs of the 78th annual meeting, to be held in Indianapolis, August 11-15.

Under the new administrative by-laws the section officers (see the JOURNAL, Dec. 1940, pp. 621-622) make up the Scientific Council, which is charged with the duty of planning the programs of the various sections, selecting the reporters and titles, and arranging the material so as to avoid duplications.

The Scientific Council will welcome the offer of papers by members up to March 30. In order to avoid conflicts or duplications of papers already scheduled, the final decision as to acceptance will be made by the respective section officers.

The closing date of March 30 must be adhered to so that delay in planning the section programs will not complicate the work of the Council. Offers of papers should be addressed to the Association's office at 600 S. Michigan Ave., Chicago, Ill., or to the section officer concerned. The title of the proposed contribution and the section for which it is intended (General Practice; Sanitary Science and Food Hygiene; Research; Small Animals; Poultry; Surgery and Obstetrics) should be given in the communication.

### **Progress Shown in Dog-Food-Testing Program; Seal Holders Cite Benefits**

With statements about the dog-food seal of approval presented at 15 veterinary meetings in December, January and the first half of February, the testing program has been launched upon what should be its most successful year.

Reports from seal holders who exhibited at the Westminster Kennel Club show in Madison Square Garden, New York City, February 11 and 12, indicate that veterinarians are coöper-

ating in the program. One exhibitor stated that many of the 2,000 breeders who stopped at his booth during the show said they had been referred to his food by veterinarians. The fact that the food carries the AAHA-AVMA Seal of Approval was given as the reason for the recommendation.

The presentation of facts about the testing program has been well received at the different state meetings. Many hundreds of copies of the booklet, "For Your Pet's Health" have been distributed and practitioners have shown marked interest in the details of the program.

### **Advisory Council to Meet**

The Advisory Scientific Council of the Committee on Foods, American Animal Hospital Association, will meet at the Palmer House in Chicago, Monday, April 14, prior to the sessions of the American Institute of Nutrition. The Council comprises George R. Cowgill, Yale University; R. A. Dutcher, Pennsylvania State College; H. H. Mitchell, University of Illinois; Agnes Fay Morgan, University of California; and Walter C. Russell, Rutgers University.

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### **Burriss Heads Columbus Serum Co.**

Following the death of President Maxwell of the Columbus Serum Company (see page 264), Columbus, Ohio, J. T. Burriss (O. S. U. '31) was named president and general manager of the firm. Dr. Burriss has been associated with the organization for three years.

### **Deubler to Sharp & Dohme**

L. P. Deubler (U. P. '38) has been named to the staff of the Sharp & Dohme medical research division at Philadelphia, Pa., where he will assist in developing new products and making professional contacts.

### **Ingmand Joins Jen-Sal Staff**

Eugene B. Ingmand (Iowa '34), former assistant executive secretary of the AVMA, arrived in Kansas City, Mo., early in February to take up an assignment with the Jensen-Salsbery Laboratories, Inc. In his new position Dr. Ingmand assumes the duties in laboratory diagnosis and editorial work handled by R. L. Anderes (K.S.C. '34), who has been called into military service at the Army Supply Depot, St. Louis, Mo.

### *Moving?*

Each year the Association spends a considerable sum in locating members who fail to inform us of changes of address. Members who change locations should notify the central office just as soon as possible.

# APPLICATIONS

## First Listing\*

- BAILEY, ALFRED L.  
2714 Olive St., Kansas City, Mo.  
D.V.S., Kansas City Veterinary College, 1904.  
Vouchers: F. W. Crawford and C. V. Metcalf.
- BATCHELDER, RAY M.  
3 East Lane Ave., Columbus, Ohio.  
D.V.M., Ohio State University, 1932.  
Vouchers: W. F. Guard and J. H. Knapp.
- BRAND, J. M.  
930 Sutter St., San Francisco, Calif.  
B.V.Sc., Ontario Veterinary College, 1915.  
Vouchers: Emmet W. Paul and J. R. Whitman.
- DINSMORE, RICHARD J.  
R. F. D., Marlborough, Mass.  
M.D.V., Harvard University, 1900.  
Vouchers: H. W. Jakeman and Charles H. Tilton.
- FAULKNER, C. M.  
Manhattan, Ill.  
D.V.M., McKillip Veterinary College, 1915.  
Vouchers: T. J. Foster and C. Vanderwarf.
- FORTUNE, R. L.  
62 Port St., Pulaski, N. Y.  
D.V.M., Cornell University, 1935.  
Vouchers: C. H. Hoppenstedt and W. S. Stone.
- GRAYEV, A. THEODORE  
1022 Bluff St., Dubuque, Iowa.  
D.V.M., Alabama Polytechnic Institute, 1938.  
Vouchers: V. B. Vanderloo and J. H. Digranes.
- HENDERSON, H. E.  
Wilton Junction, Iowa.  
D.V.M., Kansas City Veterinary College, 1917.  
Vouchers: Jasper S. Potter and Harold E. Johnston.
- HOFFERT, ELWOOD J.  
522 S. State St., Caro, Mich.  
D.V.M., Ohio State University, 1938.  
Vouchers: C. H. Hays and M. P. Hunt.
- KAISER, J. C.  
Rockwell, Iowa.  
D.V.M., Iowa State College, 1935.  
Vouchers: Laurance P. Scott and J. G. Hardenberg.
- LEIBERT, ARTHUR L.  
R. D. 1, Emmaus, Pa.  
V.M.D., University of Pennsylvania, 1938.  
Vouchers: John D. Beck and Frank E. Lentz.
- LOGAN, WILLIAM C.  
P. O. Box 141, Nashville, Ill.  
D.V.M., St. Joseph Veterinary College, 1922.  
Vouchers: Wilbur McPherson and Theodore M. Bayler.
- LUCAS, JAMES R.  
Morrisonville, Ill.  
D.V.M., McKillip Veterinary College, 1918.  
Vouchers: H. C. Rinehart and C. W. McLaughlin.
- McFADDEN, M. C.  
3100 E. 1st St., Sioux City, Iowa.  
D.V.M., Colorado State College, 1933.  
Vouchers: C. H. Pals and O. W. Seher.
- MEYEROWITZ, BERNARD  
1375 E. 57th St., Chicago, Ill.  
V.M.D., University of Pennsylvania, 1936.  
Vouchers: R. A. Resseguie and Max Fields.
- NEBEKER, SHIRLEY  
Box 333, Ogden, Utah.  
D.V.S., Kansas City Veterinary College, 1911.  
Vouchers: G. H. Ehlers and E. D. Leiby.
- NOMURA, PAUL T.  
767 Ala Moana, Honolulu, Hawaii.  
D.V.M., Kansas State College, 1936.  
Vouchers: Edwin J. Frick and Lloyd C. Moss.
- O'HARA, ALBERT J.  
700 College Ave., Northfield, Minn.  
V.S., Ontario Veterinary College, 1908.  
Vouchers: John N. Campbell and Carl Hansen.
- PIERSON, I. J.  
Lock Box 364, Lawrence, Kan.  
D.V.M., Kansas City Veterinary College, 1918.  
Vouchers: Chas. W. Bower and S. L. Stewart.
- RASMUSSEN, J. E.  
3760 Riverdale Rd., Ogden, Utah.  
D.V.M., Colorado State College, 1937.  
Vouchers: E. D. Leiby and G. H. Ehlers.
- SALTER, WILLIAM REED  
2032 - 27th St., Des Moines, Iowa.  
D.V.M., Chicago Veterinary College, 1912.  
Vouchers: A. H. Quin and L. A. Merillat.
- SCHMIDT, NORMAN P.  
366 Keele St., Toronto, Ont.  
B.V.Sc., Ontario Veterinary College, 1939.  
Vouchers: Wm. Moynihan and G. A. Rose.
- SINCLAIR, ROY I.  
366 Keele St., Toronto, Ont.  
B.V.Sc., Ontario Veterinary College, 1939.  
Vouchers: Wm. Moynihan and G. A. Rose.
- SUYDAM, B. WEBSTER JR.  
441 George St., New Brunswick, N. J.  
D.V.M., Cornell University, 1931.  
Vouchers: J. R. Porteus and R. A. Hendershott.
- WINTRINGHAM, H. B.  
Lakeport, Calif.  
D.V.M., San Francisco Veterinary College, 1914.  
Vouchers: W. L. Curtis and Joseph M. Arburua.

\*See January 1941 issue, page 88.



**WOOD, EMLÉN**

2210 Locust St., Philadelphia, Pa.  
V.M.D., University of Pennsylvania, 1916.  
Vouchers: A. Henry Craige, Jr., and J. G. Hardenbergh.

**WRABEL, ARNOLD**

1710 Hoe Ave., New York, N. Y.  
D.V.M., Alabama Polytechnic Institute, 1940.  
Vouchers: Earl Baumwell and Samuel Edelstein.

**Second Listing**

Archer, Odell, Clinton, Ind.  
Bigert, Edward J. J., 51 Union St., Walton, N. Y.  
Boyer, W. Philip, 1 Glenbrook Rd., Morris Plains, N. J.  
Bryan, H. E., Angola, Ind.  
Church, Dwight S., 1527 N. Washington Ave., Scranton, Pa.  
Clark, Harold C., 3 Sharon St., Geneva, N. Y.  
Clark, Maurice E., Boston, Ind.  
Conger, Wilmer I., 2420 N. 43rd St., Kansas City, Kan.  
Davidson, L. R., 2426 Grand Ave. W., Detroit, Mich.  
Davidson, W. B., P. O. Box 1177, Swift Current, Saskatchewan.  
Evans, William M., 110 Delaware Ave., Ithaca, N. Y.  
Forsythe, R. H., 389—5th Ave. N., South St. Paul, Minn.  
Friedley, Stanley M., Decatur, Ind.  
Friedline, Lloyd M., Jonesboro, Ind.  
Gruner, W. H., 412 W. Franklin St., Evansville, Ind.  
Haffich, Curtis E., Markle, Ind.  
Hauge, Ronald, 924 Del Paso Blvd., North Sacramento, Calif.  
Hiatt, Chas. B., Kewanna, Ind.  
Hiner, O. W., Butler, Ind.  
King, Roe, Sheridan, Ind.  
McDonald, Ian C., P. O. Box 594, Newman, Calif.  
Merryman, Walter R., 644—4th Ave., South St. Paul, Minn.  
Nottingham, M. O., 101 Broadway, Summitville, Ind.  
Nutter, Byron J., R. R. No. 1, New Augusta, Ind.  
Phillips, C. E., 55A MacKay Ave., W. Toronto, Ontario.  
Pursley, Fred, Modoc, Ind.  
Retamales, N., R., Avenida Malta 391, Santiago, Chile.  
Roberts, James F., Swayzee, Ind.  
Seibert, Norman E., R. D., Hummelstown, Pa.  
Timms, John M., 218 Grove St., Hudson, Mich.  
Vail, Edward L., 203 Administration Bldg., Union Stock Yards, Los Angeles, Calif.  
Welbourn, W. E., Winchester, Ind.  
White, Herbert G., 903 S. Jackson St., Frankfort, Ind.

**U. S. GOVERNMENT****Foot-and-Mouth Disease in Ireland Leads to U. S. Import Restrictions**

The Secretary of Agriculture, on the recommendation of the BAI, has issued an order restricting the importation of livestock and animal products from Ireland due to an outbreak of foot-and-mouth disease on the island. This virtually quarantines all of Europe and the British Isles because of the disease.

The order prohibits the importation, into the United States, of cattle, sheep, goats and swine. There are special restrictions on certain animal products. Few livestock, however, are shipped from Ireland, the British Isles or Europe; shipments are mostly purebred breeding stock.

Since the beginning of the war, foot-and-mouth disease has spread on the continent of Europe, in most instances along invasion routes. Restrictions first were placed on Finland, following the war with Russia. Soon after the German invasion there was an outbreak of the disease in Norway and restrictions were extended to that country.

There has not been an outbreak of the disease in the United States in twelve years, the longest free period since the turn of the century.

**Army Life Increases Egg and Poultry Consumption**

Increasing the number of men in military training will increase consumption of poultry and eggs.

Colonel Paul E. Howe, U. S. Army, formerly of the BAI, told a recent Departmental Poultry Committee meeting that transfers from civilian life to Army life stepped up egg consumption 15 per cent and poultry consumption 33 per cent. He pointed out that the garrison ration is "on the basis of an average of one egg and two ounces of chicken per day."

**Progress Made on Equine Influenza Serum**

Progress in the development of vaccine for the prevention of respiratory diseases, which frequently occur among young horses mobilized for conditioning, was reported January 16 by the War Department.

Among the major projects of the Army Veterinary Corps laboratory, established at the Quartermaster Remount Depot, Front Royal, Va., are studies of equine influenza, strangles and other associated respiratory conditions. The laboratory reports satisfactory progress is

being made toward the perfection of vaccines for the prevention of these maladies.

Gratifying results also are reported on the use of sulfanilamide in the treatment of influenza complicated by pneumonia, which has occurred among recently purchased animals. Reports indicate that the usual high mortality of these complicated influenza cases will be reduced materially by the use of this drug.

Influenza and associated conditions appear on an extensive scale when large groups of animals are purchased in various sections of the country and concentrated at remount depots or other Army posts. Influenza is a serious disease of the equine species, especially when complicated by pneumonia. It was a serious problem to all armies engaged in the World War.

### Purebred Animals Certified for Importation During 1940

The numbers of animals which were certified as purebred for entry under paragraph 1606 of the Tariff Act of 1930, during the calendar year 1940, are: horses 353, cattle 13,044, sheep 3,417, dogs 778, goats 5, cats 3, swine 41; total 17,641.

Of the horses mentioned above the following breeds were included: American Saddle 3, Arabian 3, Belgian 16, Clydesdale 17, Hackney 12, Percheron 19, Shetland Ponies 4, Standard-bred 9, Thoroughbred 268, Westland of Norway 2; total 353.

The breeds and countries of origin of the imported cattle are as follows:

|                         | Canada | Island of<br>Jersey | Mexico |
|-------------------------|--------|---------------------|--------|
| Aberdeen Angus .....    | 432    |                     |        |
| Ayrshire .....          | 1,908  |                     |        |
| Brown Swiss .....       | 29     |                     |        |
| Canadian .....          | 46     |                     |        |
| Galloway .....          | 5      |                     |        |
| Guernsey .....          | 114    |                     |        |
| Hereford .....          | 821    |                     | 425    |
| Holstein-Friesian ..... | 7,554  |                     |        |
| Jerseys .....           | 1,019  | 99                  |        |
| Red Poll .....          | 1      |                     |        |
| Shorthorn .....         | 591    |                     |        |
| Total .....             | 12,520 | 99                  | 425    |
| Grand total .....       | 13,044 |                     |        |

### Stomach Worm Infestation of Sheep Portrayed in Poster

To aid sheep owners in their fight against the ravages of the stomach worm, the most devastating of sheep parasites, the U. S. Department of Agriculture has issued a poster on the subject.

Besides portraying in picture form a lamb badly infested with the parasites, the new poster gives in a brief text a description of the stomach worm, distribution in the United States, seasonal occurrence, sources of infection, losses, common symptoms, prevention and treatment, as well as reference to literature on

the subject. The poster, printed on light cardboard, measures 16" x 20". Copies may be obtained free, as long as the supply lasts, by applying to the U. S. Bureau of Animal Industry, Washington, D. C.

The poster is the seventh of a livestock health series sponsored by the Bureau. Those previously issued deal with anthrax, equine infectious anemia, pullorum disease, encephalomyelitis, Bang's disease and avian tuberculosis. The series, when completed, will portray methods of coping successfully with many of the serious diseases and parasites affecting livestock.

### Regular Army

Lt. Col. Fred W. Shinn is relieved from assignment and duty at Fort Francis E. Warren, Wyo., effective on or about March 1, 1941, is then assigned to duty at the Seattle Quartermaster Depot, Seattle, Wash., and to additional duty as attending veterinarian at Fort Worden and Fort Lawton, Wash.

Major Lawrence R. Bower is relieved from assignment and duty at the Army Medical Center, Washington, D. C., effective on or about February 6, 1941, and is then assigned to duty in the office of the Surgeon General, Washington, D. C.

Lt. Col. Herbert K. Moore is relieved from assignment and duty at the Seattle Quartermaster Depot, Seattle, Wash., and from additional duty as attending veterinarian at Fort Worden and Fort Lawton, Wash., effective on or about March 8, 1941, and is then assigned to duty in the office of the Surgeon General, Washington, D. C.

Col. Burton A. Seeley is relieved from assignment and duty at Fort Jay, N. Y., and from additional duty at headquarters, Second Corps Area, Governors Island, N. Y., and is assigned to duty at headquarters, Second Corps Area, Governors Island, N. Y., and additional duty as attending veterinarian at Fort Jay, N. Y.

Lt. Col. Charles O. Grace is relieved from assignment and duty at Fort Meade, S. Dak., effective on or about February 1, 1941, and is assigned to duty at the Seventh Corps Area Training Center, Fort Leonard Wood, Mo.

### Veterinary Corps Reserve

The following veterinary reserve officers were ordered to extended active duty by the War Department during the month of January and assigned to stations indicated:

Capt. Robert Louis Anderes, St. Louis Medical Depot, St. Louis, Mo.

Capt. Clinton De Los Barrett, Robinson Quartermaster Depot (Remount), Fort Robinson, Neb.

First Lt. Carl F. Vaupel, Front Royal Quartermaster Depot (Remount), Front Royal, Va.

First Lt. Floyd W. Koebel, Holabird Quartermaster Depot, Baltimore, Md.

First Lt. Clayton H. Mickelsen is relieved from his present assignment and duty at Los Angeles, Calif., and is assigned to duty at the Air Corps Advance Flying School, Stockton, Calif., effective on or about January 31, 1941.

First Lt. Olin A. Anderson is relieved from assignment and duty at the Presidio of San Francisco, Calif., and is assigned to Fort Rosecrans, Calif., effective on or about January 21, 1941.

First Lt. William R. Hulbush is relieved from his present assignment and duty at Fort Lewis, Wash., and is assigned to the 99th Field Artillery at that station.

First Lt. Samuel E. Grove is relieved from assignment and duty at the station hospital, Fort Sam Houston, Texas, and is assigned to duty at the San Antonio General Depot, Fort Worth Branch, Fort Worth, Texas, effective on or about January 29, 1941.

First Lt. Burton C. Thomson, now on duty at Fort Bragg, N. Car., is continued on active duty until February 25, 1942.

Announcement is made of the promotion of the following-named officers of the Veterinary Corps Reserve, now on active duty, on date indicated opposite their name:

First Lt. Richard H. Jurden to Captain, December 31, 1940.

Captain William M. Lukens to Major (temporary), January 9, 1941.

Captain Leslie H. Baker to Major (temporary), January 21, 1941.

The following officers of the Veterinary Corps Reserve, now on extended active duty at the stations indicated, are directed to proceed to Chicago, Ill., and report to the commanding officer, Chicago Quartermaster Depot, for temporary duty for a period of 30 days for the purpose of pursuing a course of instruction, commencing on February 10, 1941, in the inspection of meat, meat-food and dairy products, under the depot veterinarian. Upon completion of this duty each of these officers (first lieutenants unless otherwise stated) will return to his proper station:

Geo. W. Snook, Fort DuPont, Del.

Captain Max H. Carlin, Fort Adams, R. I.

Geo. Walmsley, Fort Banks, Mass.

John J. Keane, Camp Edwards, Mass.

Ralph A. Maxwell, Camp Upton, N. Y.

Paul F. Landis, Fort Monroe, Va.

Captain Andy W. Crawford, Camp Blanding, Fla.

Hugh D. Smith, Camp Beauregard, La.

Benners B. Vail, Camp Shelby, Miss.

Captain Vaughn E. Ishee, Fort Knox, Ky.

Alan W. Winter, Fort Custer, Mich.

Thomas M. Eagle, Jefferson Bks., Mo.

J. B. Couch, Fort Sam Houston, Texas.

Edwin A. Beckcom, Jr., Fort Sam Houston, Texas.

James W. Heaton, Jr., Fort Sam Houston, Texas.

Wilfred S. Benthams, San Francisco Port of Embarkation.

Myron Thom, 11th Cavalry, Imperial, Calif.

Orlen L. Bailey, Fort Geo. Wright, Wash.

### BAI Transfers

George E. Aidman from Richmond, Ind., to Frankfort, Ind., in charge of meat inspection.

Scott A. Burnam from Oklahoma City, Okla., to Fort Worth, Texas, on meat inspection.

Bert J. Cady from Albany, N. Y., to Augusta, Maine, in charge of tuberculosis eradication.

David F. Eggers from Chicago, Ill., to Richmond, Ind., in charge of meat inspection.

Fred N. Elwell from Oklahoma City, Okla., to Okmulgee, Okla., in charge of virus-serum control.

Ernest F. Erfurth from San Francisco, Calif., to West Fargo, N. Dak., on meat inspection.

Edward Frahm from San Juan, P. R., to Lansing, Mich., on Bang's disease.

Edward Kernohan from Oklahoma City, Okla., to Okmulgee, Okla., on virus-serum control.

E. Sheldon Padwee from Montpelier, Vt., to New York, N. Y., on meat inspection.

Stanley E. Peters from Nashville, Tenn., to St. Louis, Mo., on meat inspection.

Raymond R. Rohrer from Ottumwa, Iowa, to Richmond, Va., on meat inspection.

Benjamin M. Schrank from Richmond, Va., to Cleveland, Ohio, on meat inspection.

Harold A. Servais from Atlanta, Ga., to New York, N. Y., on meat inspection.

Seaborn H. Still from San Juan, P. R., to Reno, Nev., in charge of tuberculosis eradication.

Charles Walter from Oklahoma City, Okla., to Okmulgee, Okla., on virus-serum control.

Leonard T. Langland from Waterloo, Iowa, to San Francisco, Calif., on meat inspection.

Richard E. Baer from Albuquerque, N. Mex., to Baltimore, Md., on Bang's disease.

David E. Bartlett from Oklahoma City, Okla., to Richmond, Va., on Bang's disease.

Floyd E. Clark from Reno, Nev., to San Francisco, Calif., on meat inspection.

George W. Famous from Cincinnati, Ohio, to Boston, Mass., in charge of meat inspection.

Loyal H. Fisk from Jefferson City, Mo., to Albuquerque, N. Mex., on tuberculosis eradication.

George N. Glover from St. Paul, Minn., to Denver, Colo., on Bang's disease.

Raymond B. Gochenour from Chicago, Ill., to Denver, Colo. (Branch Pathological Laboratory).

Doyle W. Hennessee from Jacksonville, Fla., to Baton Rouge, La., on Bang's disease.



Alfred M. Jacoby from Lansing, Mich., to Boston, Mass., on tuberculosis eradication.

James E. Kelly from Chicago, Ill., to South St. Paul, Minn., on meat inspection.

Wilbur R. Kidwell from Chicago, Ill., to Cincinnati, Ohio, in charge of meat inspection.

Wm. R. McCall from South St. Paul, Minn., to Winona, Minn., on meat inspection.

Claude B. McKim from South St. Joseph, Mo., to Des Moines, Iowa, on meat inspection.

Norton A. Orr from Sioux Falls, S. Dak., to Oklahoma City, Okla., on meat inspection.

Raymond V. Schoentrup from Chicago, Ill., to Waterloo, Iowa, on meat inspection.

Vincent J. Schweiger from Albuquerque, N. Mex., to Jefferson City, Mo., on tuberculosis eradication.

Ashley G. Stamp from South St. Paul, Minn., to Eau Claire, Wis., on meat inspection.

Arthur L. Stigers from Des Moines, Iowa, to Sioux City, Iowa, on meat inspection.

Mark H. Toroian from South St. Paul, Minn., to Portland, Ore., on meat inspection.

Clifton L. Whittington from Waterloo, Iowa, to Chicago, Ill., on meat inspection.

**Retirements.**—The following veterinarians retired on December 31, 1940: Arden L. Hirleman, Augusta, Maine; George W. Knorr, Frankfort, Ind.; Wilbur Pierret, Denver, Colo.

The following veterinarians retired on January 31, 1941: Alfred L. Bailey, Kansas City, Kan.; Charles J. O'Brien, Des Moines, Iowa; Michael Paolone, New York, N. Y.

## AMONG THE STATES

### Arizona

**Dourine.**—Arizona may suffer the penalty for being lax in animal-disease control through the prospect of a quarantine against that state on account of dourine among its horse population.

Says the *Phoenix (Ariz.) Farmer*: "Unless dourine is eradicated now, Arizona must shelve her dreams of becoming a great horse breeding state. Fairs and rodeos must stop. The United States Army will never buy any Arizona horses. A federal quarantine will be raised against the state. . . . Veterinarians laid before a committee of the Senate a program that would cost \$25,000 for 1941 and the same for 1942. The U. S. Bureau of Animal Industry will appropriate an equal amount making a total of \$100,000. That will take care of private and state lands. The U. S. Government would do the job on Indian reservations and other federal lands, amounting to 70 per cent of Arizona's area."

State Veterinarian T. B. Jones and Inspector-in-Charge F. L. Schneider of the BAI for Arizona and New Mexico are reported as stating that with proper sanitary regulation in force, dourine could be eradicated in two years.

[In printing this report, we do not discount the obstacles encountered in supervising the health of livestock roaming over extraordinarily vast and forbidden terrain.]

### Arkansas

**Annual Meeting.**—The Arkansas Veterinary Medical Association held its 25th annual meeting at the Hotel Marion in Little Rock, January 23-24, with 51 veterinarians in attendance.

Round table discussions were held the first day on subjects of current interest to Arkansas practitioners. E. L. Kittrell of Augusta and Guy A. Railsback of Batesville discussed retained placentas; A. W. Rice, BAI inspector in charge at Little Rock, reported on the Bang's disease program in Arkansas; J. N. Jerome of Wilson, C. W. Denman of Hughes and H. C. Boyd of Pine Bluff discussed respiratory disorders of cattle and horses; and J. C. Smith of Stuttgart and Lee T. Railsback of Harrison discussed digestive disorders of cattle.

A small animal clinic was held on the evening of the first day in conjunction with the Southwest Practitioners Association. A large animal clinic was held on the morning of the second day, with J. N. Jerome in charge.

New officers elected at the meeting are Fred Thompson of North Little Rock, president; D. F. Eveleth of Fayetteville, first vice-president; F. O. Garrett of Little Rock, second vice-president; and W. E. Corry of Little Rock, secretary-treasurer.

F. O. GARRETT, Reporter.

### California

**Veterinarians Wanted.**—The Los Angeles County Civil Service Commission has announced an examination for the position of veterinarian, the salary of which is \$225 a month with possible advancement to \$270.

Applications must be filed with the Commission before April 15. The three-year resident requirement has been waived and the examination is open to qualified veterinarians between the ages of 21 and 55. The Commission's address is Room 102, County Hall of Records, Los Angeles.

**Humane Work.**—Humane work has been done by veterinarians since the beginning of veterinary science but never was it done by a group until the Small Animal Hospital Association of Southern California organized a plan of cooperating with the S. P. C. A. in rendering service for worthy people not able to afford medical attention for their pets.—*From Los Angeles Examiner.*

### District of Columbia

**Quarterly Meeting.**—With R. A. Kelser presiding the District of Columbia Veterinary Medical Association held its first quarterly meeting of the year at the Mayflower Hotel in Washington, January 23.

Gerry B. Schnelle of the Angell Memorial Animal Hospital, Boston, Mass., spoke on the Lacroix operation for the drainage of the external ear and illustrated the various methods of procedure with colored Kodachrome slides. Radiographic slides showing bone diseases also were exhibited by Dr. Schnelle.

Officers for the ensuing year were elected as follows: Harry A. Locke, president; A. E. Wight, first vice-president; Major Charles S. Greer, second vice-president; and W. M. Mohler, secretary-treasurer (re-elected).

A group of officers attending the Army Veterinary School were guests of the Association. W. M. MOHLER, *Resident Sec'y.*

### Illinois

The biweekly leaflet of the state department of health, *Illinois Health Messenger*, should be read by every veterinarian of the state, a correspondent declares. It contains news of interest to our field, particularly in regard to the proper inspection of milk needed in small communities. The current issue (Feb. 15) points out that while the larger cities are "now doing a good job," the imperative need is to extend milk inspection to the smaller centers of population.

• • •

The 59th annual meeting of the state association was held at Springfield January 23-24, 1941. The registration showed 350 veterinarians and 110 ladies, or a total attendance of 460—the largest convention of Illinois veterinarians in recent years, if not in all times. [The Illinois State Veterinary Medical Association was organized in 1883.]

Outstanding features of the meeting in addition to the literary program listed below were the banquet, entertainment and dance directed by W. B. Holmes and brief addresses by Hon. Howard Loenard, director of the State Department of Agriculture, and J. G. Hardenbergh, executive secretary of the American Veterinary Medical Association.

The technical program gave an insight to the problems uppermost in the minds of practitioners in a midwestern state. The subjects and speakers were as follows:

**Rabies**—H. C. Rinehart, Chief Veterinarian, Springfield.

**Blood Transfusions**—E. E. Slatter, Danville.

**Some Highlights on Nutritional Diseases**—A. H. Quin, Fort Dodge Laboratories, Des Moines, Iowa.

**A Few Phases of Cattle Practice**—C. O. Petry, Ossian, Indiana.

**Swine Practice**—E. R. Truax, Sac City, Iowa.

**Our Present Knowledge in the Control of Coccidiosis in Chickens and Turkeys**—Cliff D. Carpenter, Pathologist, Allied Mills, Inc., Chicago.

**Daily Problems Confronting a Small Animal Practitioner**—R. E. Ruggles, Moline.

**Diet of Dogs**—Carl F. Schlotthauer, The Mayo Foundation for Medical Education and Research, Rochester, Minnesota.

**Address**—J. G. Hardenbergh, Executive Secretary, American Veterinary Medical Association, Chicago.

**Experiments with Crystal-Violet Vaccine for the Prevention of Hog Cholera**—C. G. Cole and C. N. McBryde, Pathological Division, U. S. Bureau of Animal Industry, Ames, Iowa.

**Respiratory Diseases of Swine**—W. D. Daugherty, Sterling.

D. E. Sisk, Mansfield, was elected president; W. C. Glenney, Elgin, vice-president; C. C. Hastings, secretary-treasurer, and W. E. Le-croy, member of the Executive Board. The Special Legislative Committee (Campbell, Henley, Merrillat) reported on the progress made in the proposed reorganization of the veterinary service of the state.

• • •

Chicago has become famous not only for its annual livestock exposition but also as a good location for the international poultry show. The International Poultry Exposition (Dec. 14-17, 1940) brought 225 exhibitors and 1,200 birds of outstanding quality to the International Amphitheater. The show is conducted with the cooperation of the American Poultry Association.

### Iowa

**Annual State Meeting.**—The largest attendance in the association's history was reported for the 1941 convention of the Iowa association held in Des Moines in January. The overflow crowds at the sessions and banquet tell the story of the interest Iowa is taking in organized medicine. The fact that Iowa's many well-patronized local societies are not detracting interest from the parent association is not only a guide for similar developments in other states but also evidence that the habit of frequent communion is a wholesome addiction, contrary to impressions once believed that local societies and their popular distractions are growing at the expense of centralized efforts.

Much credit belongs to the intrepid leaders deployed over the state, who take time out for local, state and national promotion.

C. C. Frank, editor of the *Iowa Veterinarian*, was re-elected secretary-treasurer; G. G. Baker of Spencer was installed as president, to succeed Guy S. Jones of Audubon, and P. V. Neuzil of Blairtown was chosen president-elect. G. A. Hawthorne of Clarinda was elected

first vice-president; M. E. Pomeroy of Stratford, second vice-president; and C. A. Stewart of Tripoli, executive board member for the second district.

Editor Frank was named delegate and H. D. Bergman, alternate to the House of Representatives of the AVMA for the stated term of two years.

### Maine

The Maine Veterinary Medical Association held its annual business meeting at the hospital of M. E. Maddocks in Augusta, January 8. All of the officers for 1940 were reelected. Thereby, S. W. Stiles of Falmouth Foreside again serves as president; A. E. Coombs of Skowhegan, vice-president; and J. F. Witter of Orono, secretary-treasurer. P. R. Baird of Waterville heads the executive committee; other members of the committee are C. E. Dutton of Saco and C. M. Merrill of South Paris.

Bert Cady, recently appointed BAI inspector in charge for Maine, was introduced. P. R. Baird of the state examining board reported a proposed revision of the practice act which would raise the standards for veterinarians applying for license to practice in the state.

S. W. Stiles reported for the Association's special Bang's disease committee, which has become affiliated with a similar committee of the Maine Livestock Breeders' Association in an effort to effect a satisfactory control program for the state.

Featured on the program were two quiz sections—one on large animals, conducted by E. C. Moore of Lewiston, and the other on small animals, conducted by S. W. Stiles.

J. F. WITTER, *Secretary*.

### Minnesota

The increasing interest in diseases of fur-bearing animals was shown at the annual banquet of the Minnesota Fox and Fur Breeders' Association, held at Minneapolis in connection with the 1940 meeting of that organization.

Seth S. Osborn of Waterville, veterinarian of wide experience in the raising of minks, spoke on mink feeding. T. T. Chaddock of the Wisconsin Experimental Fur and Game Farm described his researches on mink diseases and R. G. Green of the Medical School, University of Minnesota, spoke on the latest developments in distemper and nutritional deficiencies.

Among the projects proposed for 1941 is a live fox and mink show.

**Minnesota State Annual.**—A. E. Wight, president of the American Veterinary Medical Association, addressed the state society on "The Veterinarian and the AVMA." W. M. Haskell of the United States Public Health Service spoke on "The Veterinarian's Role in Milk Sanitation"; J. E. Weinman, practitioner

of Lincoln, Neb., on "Equine Practice"; F. C. Tucker, practitioner of Claypool, Ind., on "The Veterinarian and Poultry Practice"; J. B. Bryant, practitioner of Mount Vernon, Ia., on "Swine Practice"; R. D. Wenger, practitioner of Minneapolis, on "Physical Examination and Diagnosis of Diseases of Pet Animals"; E. A. Benbrook of Iowa State College, Ames, Ia., on "Parasite Problems of Domestic Animals"; and J. S. Katz of the Bureau of Animal Industry in St. Paul on "Brucellosis of Wild Life."

The Society resolved to request the Congressmen from this state to secure legislation amending the present laws providing for the licensing of manufacturers and distributors of veterinary biological products destined to interstate shipment and distribution, authorizing and directing the Secretary of Agriculture to prohibit the shipment of virus, bacterins, vaccines, antigens, or other products capable of exciting reaction to or causing any infectious or communicable disease of animals from licensed manufacturers into any state in violation of the laws or livestock sanitary regulations of that state.

It was also resolved that their Congressmen use their influence toward enacting legislation which will include veterinary students along with medical and dental students with respect to commissions in the medical and dental reserves under the Selective Service Act, since, in the opinion of the membership, the welfare of draft, dairy, and meat-producing animals is vital to the welfare of the nation, and every consideration should be given those whose function is to maintain the health of animals.

Officers for the coming year are: H. G. McGinn of Brainerd, *president*; F. W. Hansen of Pelican Rapids, *president-elect*; D. L. Halver of Shakopee, *first vice-president*; J. S. Dick of Minneapolis, *second vice-president*; H. C. H. Kernkamp of St. Paul, *secretary-treasurer*; R. A. Hallquist of Brainerd, *member of the board of trustees* to serve three years.

A. H. Schmidt of Triumph was elected delegate to the House of Representatives of the AVMA and Harry Hedin of Crookston the alternate.

H. C. H. KERNKAMP, *Secretary*.

### New Jersey

The 57th annual meeting of The Veterinary Medical Association of New Jersey was held at Trenton on January 15-16, 1941, with 120 members and guests in attendance. During the sessions the following topics were presented:

"Reproductive Disorders in Cattle" (sound picture demonstration), Charles J. Fanslau, New York City.

"What the Vitamins Will Not Do," M. L. Morris, Stelton.

"Regulatory Matters of Interest to Veterinarians," R. A. Hendershott, Trenton.



## Dry Clinic—

1) "The Clinical Use of Staphylococcus Vaccine," L. R. Barto, Basking Ridge.

2) "New Treatment for Summer Eczema," F. H. Owens, Audubon.

3) "Periodic Ophthalmia from a Practitioner's Standpoint," A. W. Stults, Hopewell.

4) "Therapeutic Uses of Pectin," E. P. Leonard, Summit.

"The Veterinarian and Poultry Practice," F. R. Beaudette, New Brunswick.

"The Dog-Food-Testing Program — Its Significance to the Owner, Agriculture, Industry, and the Veterinarian," William R. Ecker, Newark.

"Some Medico-Legal Aspects of the Practice of Veterinary Medicine," William P. Braun, Counselor at Law, Newark.

"Rickets in Calves," Standard Brands, Inc.

"Gramicidin, A Bactericidal Substance Selective for Gram-Positive Microorganisms," R. J. DuBos, Rockefeller Institute, New York City.

"A Discussion of the Treatment of Bovine Mastitis with Gramicidin," R. B. Little, Rockefeller Institute, Princeton.

"The Veterinarians' Information, Please" proved diverting as well as informative. The participants were J. Gray, R. S. Huff, W. H. Ivens, J. A. S. Millar and A. C. Wood.

President A. E. Wight of the national association addressed over 100 members and guests at the banquet on the evening of the 15th. J. Payne Lowe of Passaic acted as toastmaster. Henry W. Jeffers spoke briefly and President Kimmach presented H. C. Millar with a citation in honor of the completion of 50 years of outstanding service in the practice of veterinary medicine.

Officers elected for the ensuing year are J. T. McGrann, president; R. A. Hendershott, first vice-president; J. A. S. Millar, second vice-president; J. R. Porteus, secretary; and J. B. Engle, treasurer.

J. R. PORTEUS, *Secretary.*

## New York

A regular meeting of the Veterinary Medical Association of New York City was held at the Hotel New Yorker in New York, January 15, C. E. DeCamp presiding.

Diseases of the ear were discussed by Guest Speaker William H. Silverstein, otolaryngologist and plastic surgeon of the Bronx Hospital. Case reports on neuritis in a dog and osteosarcoma in a dog were presented by L. Corwin and Max Shindell, respectively.

J. J. MERENDA, *Secretary.*

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Mrs. V. A. Moore, wife of the late Veranus A. Moore, died on January 7, 1941, at Ithaca, N. Y. [Dr. Moore will be remembered as onetime dean of the New York State Veterinary College at Cornell University and as president of the AVMA in 1918-1919.]

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The American Museum of Health, occupying one of the permanent buildings of the World's

Fair at Flushing Meadow Park, will be made a free health museum that will be open to the public every day in the year. The building formerly housed the masterpieces of the art museum. It will form an important civic, educational and recreational center and will be opened May 1, 1941, according to present plans.

## North Carolina

**Annual State Meeting.**—The 1941 meeting of the state association was outstanding in regard to talented contributors mobilized from far and wide. Among them were J. S. Koen, swine specialist of the higher brackets; James Farquharson, prominent surgeon of Colorado State College; C. F. Schlotthauer, animal pathologist of The Mayo Foundation; Hubert Bunea, poultry specialist of the U. S. Bureau of Animal Industry in Washington, D. C.; and A. A. Husman, local BAI inspector in charge. Added was the talent of the North Carolina State College and association members to make up a program roster of unusual merit for a small state society.

## Oklahoma

**Annual Meeting.**—The 26th annual meeting of the Oklahoma Veterinary Medical Association was held at the Skirvin Hotel, in Oklahoma City, January 13-14, with about 80 veterinarians registered.

Louis H. Ritzhaupt, M. D., a member of the state senate and state draft director, delivered the address of welcome, and L. H. Moe of the Oklahoma A & M College staff responded.

Papers were presented on "Swine Erysipelas and Commonly Encountered Enteric Diseases of Swine," by L. E. Willey of Allied Laboratories, Sioux City, Iowa; "Treatment of Small Animal Parasites, and Parasites and Therapeutics of Large Animals," by H. L. Van Volkenberg of Texas A & M College, College Station, Texas; "Equine Encephalomyelitis," by L. T. Giltner of the U. S. Bureau of Animal Industry, Washington, D. C.; and "Rabies and Newer Developments in Canine Diseases," by G. L. Dunlap of Ashe Lockhart, Inc., Kansas City, Mo.

Lee G. Gill of Oklahoma City, attorney for the Oklahoma Board of Veterinary Medical Examiners, reported on enforcement of the practice act. H. Wood Ayers of Oklahoma City, delegate to the House of Representatives of the national association, reported on the Washington session.

A resolution was adopted by unanimous vote praising and assuring cooperation in the educational program of the American Foundation for Animal Health, which is directed and supported by the Associated Serum Producers.

With 115 in attendance, a banquet followed by entertainment and dancing was held on the evening of the first day in the Venetian Room of the Skirvin Hotel.

Officers elected for 1941 are W. F. Irwin of Tulsa, president; J. H. Wirtz of Oklahoma City, vice-president; and F. Y. S. Moore of McAlester, secretary-treasurer (re-elected).

The Ladies' Auxiliary was active throughout the meeting and elected new officers as follows: Mrs. C. H. McElroy of Stillwater, president; Mrs. F. Y. S. Moore of McAlester, first vice-president; Mrs. F. R. Knotts of Stillwater, second vice-president; Mrs. L. B. Barber of Oklahoma City, secretary-treasurer; Mrs. L. J. Allen of Oklahoma City, historian; and Mrs. H. Wood Ayers of Oklahoma City, parliamentarian.

F. Y. S. MOORE, *Secretary*.

### Pennsylvania

**Annual Conference.**—The 41st annual conference of veterinarians held at the University of Pennsylvania was called to order by Dean G. A. Dick in the veterinary building, January 7.

The address of welcome by the president, Thomas S. Gates, drew attention to the importance of the scientific meetings now in progress despite the existence of war. He spoke of the many groups of scholars and scientists who have come to the campus during this bicentennial year, representing forces of logical thought and consistent action to bring hope to a chaotic world. Dr. Gates promised that the University will take a significant part in the national defense program.

Captain W. E. Jennings, V.C., Front Royal, Va., presented the topic "Equine Abortion and Diseases of Foals." He reviewed the various causes of abortion in mares and disease in young foals, and described the methods employed at the breeding farms of the U. S. Army for keeping these losses at a minimum.

R. B. Little of The Rockefeller Institute for Medical Research, Princeton, N. J., then addressed the gathering on "The Treatment of the Chronic Form of Streptococcal Mastitis, Essentially with Gramicidin." "Trauma, a Medical and Surgical Problem in Small Animal Practice," the last paper in the first session, was read by J. A. S. Millar of Deal, N. J. It was a general discussion of surgical injuries and a review of pertinent cases recently treated in the Millar Animal Hospital. Dr. Millar stressed the practical value of knowledge of the basic sciences to enable the diagnostician and surgeon to handle these varied problems successfully. He dwelt at some length on surgical shock, blood transfusion and saline injection, the treatment of wounds and the use of sutures. This was the only paper devoted to small animal practice.

The evening session, at which F. E. Lentz presided, featured a talk by Colonel R. A. Kelsner, V. C., U. S. Army, stationed at Washington,

D. C. As senior veterinary officer, Colonel Kelsner spoke on the "Army Veterinary Corps," a subject of prime interest to all veterinarians and especially to men of military age. He outlined the organization of the Corps and pointed out that the army at prescribed maximum defense strength will require 3½ million pounds of meat each day, inspection of which will be one of the duties of the Veterinary Corps.

Also, the number of horses to be used in the army will be increased considerably in view of the fact that horses and mules have been proved indispensable by the present European war, despite the modern trend toward mechanization. Further return to the horse in warfare is indicated by the announcement of a second cavalry division to be activated in the course of rearmament.

Following Colonel Kelsner's talk, E. L. Stubbs and R. C. Snyder showed a motion picture depicting the formation of the egg in the hen. This film was prepared by the staff in poultry husbandry at Kansas State College. It portrayed through a series of vivisections and animations the development of an egg from its initial escape from the ovary to the final product in the uterus of the hen.

The meeting on Wednesday morning, January 8, directed by H. C. Campbell, was devoted to Bang's disease in cattle. One of the scheduled speakers, M. F. Barnes, chief of the laboratory division of the Pennsylvania Bureau of Animal Industry, was unable to appear due to illness. The Bureau was represented in his stead by C. P. Bishop, the director, who opened the meeting with a report on "Progress of Bang's Disease Control in Pennsylvania." Pennsylvania was a pioneer in the control of Bang's disease, through the early efforts of this bureau. Since 1927, almost \$2,000,000 has been expended in indemnity for infected animals. As a result of continued effort, the incidence has been reduced greatly in this state, with 17 counties now classed as "modified accredited Bang's disease free."

"Calfhood Vaccination with Strain 19" was the subject of a paper read by H. M. O'Rear of the U. S. Bureau of Animal Industry, Washington, D. C. Dr. O'Rear described an investigation conducted by the Bureau in which almost 6,000 cattle were vaccinated against Bang's disease during calfhood, have been bred and calved at least once. A few of them have gone through a fourth pregnancy and many more a second and third. In view of the fact that all these animals belong to herds known to be infected with Bang's disease, and remained in these herds throughout the period of study, it is significant that only 2 per cent aborted and after abortion gave positive reaction to blood tests.

In the absence of Dr. Barnes, the chairman called upon Mark Welsh, state veterinarian of Maryland, to lead a discussion. Dr. Welsh disclosed the results of studies showing that about

nine months usually is required for the blood titer to disappear (end of reaction to vaccination) from calves vaccinated at 3 to 8 months of age. This period is longer for older animals, and the number of heifers losing a titer completely is proportionately less as the age of vaccination is advanced. For practical purposes, then, it is doubly desirable to vaccinate at an early age.

Following this introduction by Dr. Welsh, the discussion became general and vigorous. Drs. Hendershott, Herriot, Reichel, Emmerson, Price and nearly every one else present asked questions and offered contributions to the debate. The meeting ended with the audience about evenly divided on the subject of calfhood vaccination, as is usually the case.

The final session of the conference, Wednesday afternoon, was opened by W. J. Lee, who introduced the first speaker, H. M. Martin, of the University of Pennsylvania. Dr. Martin delivered an address on "Ticks and Their Importance to Animals and Man." There are three varieties of ticks commonly encountered in the United States, and one of these, the Texas fever tick, has been almost exterminated. Of the other two species, the brown dog tick and the wood tick, chief interest in the former lies in the features which distinguish it from the latter. It is the wood tick which is capable of transmitting to man Rocky Mountain spotted fever, tularemia and many other deadly diseases. Dr. Martin pointed out, in connection with the possibility of infections through tick bites, that the danger of bites from infectious ticks is remote in this area.

Benjamin Schwartz, chief of the Zoological Division, U. S. Bureau of Animal Industry, presented a paper entitled "Phenothiazine as an Anthelmintic."

The conference closed with a poultry clinic conducted by P. H. Seitz of the Pennsylvania Bureau of Animal Industry.

The meetings, held in a room which seats 150, all were well attended; at times there was not even standing room. The field covered and the interest shown by the audiences give foundation to the belief of the committee that this conference, the 41st of a series which began in 1900, fulfilled the aims originally laid down by Leonard Pearson.

A. HENRY CRAIGE, JR., *Resident Sec'y.*

**Keystone Association.**—The Keystone Veterinary Medical Association, at its regular monthly meeting, January 22, at the University of Pennsylvania, Philadelphia, was addressed by H. W. Barnard, secretary of the state veterinary examining board, and M. A. Emmerson, assistant professor of veterinary surgery at the University of Pennsylvania.

Dr. Barnard reviewed the history of the board and spoke about problems arising through illegal practice. The Association was glad to hear that the proposed new practice act is soon to go to the legislature. This act will "put teeth" in the laws curbing veterinary work by unlicensed persons, giving the board authority to suppress many forms of abuse reported in the past and, unfortunately, still reported.

Dr. Emmerson described the physiologic disturbances thought to cause cryptorchidism. He reviewed the literature on this problem and presented an interesting film on the operation to remove the retained testicle. The film was prepared by his staff at the University and showed the operation performed in the standing position, with local anesthesia.

A. HENRY CRAIGE, JR., *Sec'y.*

## Wisconsin

**Annual Meeting.**—The Wisconsin Veterinary Medical Association held its annual winter meeting at the Park Hotel in Madison, January 8-9, with 146 veterinarians in attendance.

Frank Breed of Lincoln, Neb.; John B. Bryant of Mount Vernon, Iowa; L. A. Dykstra of Galesburg, Ill.; and F. C. Tucker of Claypool, Ind., contributed to the program.

E. G. Doudna of Madison, secretary of the Board of Regents of Normal Schools, was the guest speaker at the banquet, which was attended by 185 veterinarians, their wives and guests.

R. C. Finkle of Seymour was elected president; J. B. Wilson of St. Croix Falls, vice-president; W. L. Richards of Morrisonville, treasurer; B. A. Beach of Madison, secretary; and C. F. Van de Sand of Kiel, director.

J. S. HEALY, *Resident Sec'y.*

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State Veterinarian Larson (*Hoard's Dairyman*, Jan. 10, 1941) reports that the average number of artificial inseminations per conception in 1,187 cows was 1.68 per cent, which is a slightly higher rate than from natural service.

## COMING MEETINGS

Small Animal Hospital Association. Los Angeles, Calif. March 4, 1941. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.

New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. March 5, 1941. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.



Dallas-Fort Worth Veterinary Medical Society.  
Fort Worth, Texas. March 6, 1941. R. L. Rogers, Jr., secretary, Route 2, Gordon, Texas.

Houston Veterinary Association. Houston, Texas. March 6, 1941. W. T. Hufnall, secretary, 1612-14 E. Alabama Ave., Houston, Texas.

St. Louis District Veterinary Medical Association. Roosevelt Hotel, St. Louis, Mo. March 7, 1941. J. P. Torrey, secretary, 555 N. 14th St., East St. Louis, Ill.

Ak-Sar-Ben Veterinary Medical Association. Fontenelle Hotel, Omaha, Neb. March 10, 1941. J. D. Ray, secretary, 1124 Harney St., Omaha, Neb.

Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. March 11, 1941. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.

Southeastern Michigan Veterinary Medical Association. Medical Arts Bldg., 3919 John R. St., Detroit, Mich. March 12, 1941. F. D. Egan, secretary, 17422 Woodward Ave., Detroit, Mich.

Kansas City Veterinary Medical Association. Kansas City, Mo. March 17, 1941. S. J. Schilling, secretary, Box 167, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoölogical Research Bldg., Balboa Park, San Diego, Calif. March 17, 1941. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. March 19, 1941. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa. March 26, 1941. A. Henry Craige, Jr., secretary, University of Pennsylvania, Philadelphia, Pa.

Massachusetts Veterinary Association. Hotel Westminster, Boston, Mass. March 26, 1941. H. W. Jakeman, secretary, 44 Bromfield St., Boston, Mass.

Midwest Small Animal Association. Burlington Hotel, Burlington, Iowa. April 3, 1941. C. L. McGinnis, secretary, 1314 Main St., Peoria, Ill.

American Animal Hospital Association. Hotel Statler, Buffalo, N. Y. April 23-26, 1941. J. V. Lacroix, secretary, Box 550, Evanston, Ill.

## PERSONAL NOTES

### Births

To Dr. (U.P. '35) and Mrs. J. N. Newcomer of Mount Joy, Pa., a son, October 21, 1940.

To Dr. (Iowa '20) and Mrs. C. Herman Beckman of St. Louis, Mo., a son, Jon Paul, November 7, 1940.

To Dr. (Colo. '35) and Mrs. R. R. Younce of Vancouver, Wash., a son, Geary Ralph, November 7, 1940.

To Dr. (Ohio '37) and Mrs. Edward T. Marsh of Columbus, Ohio, a daughter, Nancy Harriet, November 20, 1940.

To Dr. (Ohio '38) and Mrs. Charles H. Ozanian of Downey, Calif., a daughter, Evelyn Mae, February 12, 1941.

### Marriages

John L. Halloran, Jr. (Corn. '39) of Stapleton, N. Y., to Patricia O'Connor (Corn. '39) of Buffalo, N. Y., at Stapleton, November 1940.

Lieut. Edwin J. Sunderville (Corn. '39) of Fort Oglethorpe, Ga., to H. Jean Gardner of Barker, N. Y., at Barker, N. Y., November 23, 1940.

Donald B. Craig (U.P. '40) of Princeton, N. J., to M. Nannette Duryea of Somerville, N. J., December 19, 1940.

Howard Meyers (Iowa '39) of Jamaica, N. Y., to Ethyl Skredsvig of Blooming Prairie, Iowa, at Blooming Prairie, January 10, 1941.

Harold T. Rose (Mich. '39) of New Canaan, Conn., to Louise Alexander, February 14, 1941, at New York.

William W. Judson (Tex. '38) of Laredo, Texas, to Beatrice May Codie, February 15, 1941, at Mexico City, Mexico.

### Activities

Captain T. J. Leasure (K.S.C. '30), practitioner of Lawrence, Kan., has been called to serve with the 127th Field Artillery. His brother, E. E. Leasure (K.S.C. '23), of the veterinary faculty of Kansas State College, has taken over the captain's practice.

R. A. Self (Tex. '27) of Dallas, Texas, has opened a new small animal hospital in Dallas, Texas, in addition to the one he has been operating at another location in that city for several years.

Jay H. Bouton (Colo. '25) of Aurora, Colo., has been called into Army service and in his absence his practice will be handled by F. J. Christensen (Colo. '28), formerly of Trinidad, Colo.

Sidney A. Roth (Tex. '40) has taken over the practice of L. J. Lauraine (K.C.V.C. '18) of Gonzales, Texas, who has been called into active Army duty.

J. G. McGrath (S.F. '15) has resigned as district veterinarian of the Colorado-Wyoming CCC and is taking graduate work at the University of Kentucky.

Carl L. Howarth (Colo. '35), who was formerly associated with the veterinary department of Oregon State College, is now operating the Salem Veterinary Hospital at Salem, Ore.

Philip H. Graves (Colo. '33), formerly in practice at Idaho Falls, Idaho, has purchased the practice of H. R. Groome (K.S.C. '07) at Twin Falls, Idaho. M. K. Jarvis (K.S.C. '40), who was associated with Dr. Groome, has purchased the practice of Dr. Graves at Idaho Falls.

Charles Hart (Chi. '11), recently retired from the federal service, is now located at Holcombe, Wis.

J. B. Key (K.S.C. '39), formerly located at Campbellsport and Mishicot, Wis., has been granted a license by the Nevada examining board and has located for general practice at Reno, Nev.

Charles C. Rife (Corn. '25) of Atlanta, Ga., has been elected to the Atlanta Board of Education.

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## DEATHS

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**P. L. Varble** of Bloomington, Ill., died at the age of 53 on December 29, 1940.

Dr. Varble was a graduate of the Kansas City Veterinary College, class of '10.

**Seymour V. Lewis** of Glenwood City, Wis., died on January 3, 1941, at the age of 65.

Dr. Lewis was born at Iola, Kan., May 19, 1875, and was graduated from the Grand Rapids Veterinary College in 1904.

**F. J. Santee** of Sterling, Ill., died at the age of 58 on December 7, 1940.

Dr. Santee was born at Finesville, N. J., February 18, 1882, and was graduated from the Chicago Veterinary College in 1914.

**O. Emmitt** of Wichita, Kan., died at the age of 59 on January 10, 1941.

Born at Cato, Kan., November 1, 1881, Dr. Emmitt was graduated from the Kansas City Veterinary College in 1906. He joined the Association in 1917.

**E. G. Smart** of Napa, Calif., died in January 1941.

Born June 6, 1874, at Salinas, Calif., Dr. Smart was graduated from the San Francisco Veterinary College in 1910. He joined the AVMA in 1940.

**Carl Graff** of Bisbee, N. Dak., died of a heart attack at Minneapolis, Minn., December 7, 1940.

Born at Oslo, Norway, July 25, 1877, Dr. Graff was graduated from the Royal Veterinary & Agricultural College of Denmark in 1906.

At the time of death Dr. Graff was in the employ of the U. S. Bureau of Animal Industry, with station in North Dakota. He joined the AVMA in 1911.

**Earl P. Maxwell** of Columbus, Ohio, died of a heart attack on December 13, 1940.

Born at Kingston, Ohio, July 5, 1889, Dr. Maxwell was graduated from The Ohio State University in 1915. From 1915 to 1924, he was associated with the Ohio Department of Agriculture as investigator of swine diseases. He joined the Columbus Serum Company in 1924 as vice-president and continued in that office until 1933, when he became president-treasurer, serving in that capacity until his death.

Dr. Maxwell's activities in football were of national prominence. He joined the Association in 1920.

**J. J. Hogarty** of Oakland, Calif., died on June 22, 1940, following an illness of several months.

Born in Oakland, October 6, 1867, Dr. Hogarty was graduated from the San Francisco Veterinary College in 1900. He served as surgeon and as instructor in anatomy at his alma mater for several years before becoming associated with R. A. Archibald, whose practice he acquired after the latter's death in 1922. He was appointed livestock inspector for Alameda county (Calif.) in 1917 and held that office in conjunction with private practice until he retired in 1937.

Mention should be made of his coöperation with public welfare organizations and institutions, particularly the Alameda county SPCA, the Veterinary Science Division of the University of California, and the local and state agricultural and public health departments. He was the first person to bring to official attention the 1924 outbreak of foot-and-mouth disease and thus make possible prompt action by state and federal officers. He served on the state board of veterinary examiners under two governors.



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The Cutter Saftivalve and Saftivac transfusion outfit, developed for human blood transfusion, has proven a "natural" in the hands of the veterinarian. Properly transfused whole blood is dramatically effective in the treatment of such infectious diseases as calf scour, navel ill, and canine distemper, and is less expensive than the use of stock serum. It is, of course, specific in the treatment of hemorrhage or shock due to surgery or traumatic injury.

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Serum is supplied in 100 cc., 250 cc., and 500 cc. rubber-capped bottles.

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## **An' Related Topics**

### **"Dime a Dozen"**

The sale of pullet eggs is said to be a racket. Eggs of adult hens run from 18 to 26 oz. per dozen. That is, a dozen of eggs should weigh from 1.125 to 1.620 lb. Pullet eggs of half that weight retail at the market price of regular eggs and in restaurants at the usual menu rate, although in terms of nourishment they are worth (wholesale) but a "dime a dozen."

### **Antiphlogistine**

Fifty years ago two young Denver (Colo.) physicians, Charles A. Brace and Elmer A. Sheets compounded a preparation from a clay that was to become widely known throughout the civilized world. They called it antiphlogistine and recommended it for the external treatment of inflammatory processes. Its popularity grew to unexpected heights and as a consequence it was soon manufactured on a large scale and distributed to the remotest ends of the earth. No proprietary remedy has enjoyed a longer period of popularity and certainly none has more real friends.

### **Malaria**

Malaria, though not an animal disease, is of interest to veterinarians as citizens and victims of it. It is a disease whose pathology is better understood than its prevention is effective. Its therapeutics has not changed in several centuries. Cinchona of the Incas, later refined to an alkaloid, is still the approved remedy. Succadaneous drugs have dubious value, and regardless of forty years of prevention through mosquito control, authorities report from one to four million cases and from two to five thousand deaths annually in the United States. Much of this is due to self-medication, particularly among the Negro populations of the South, and as pointed out by H. W. Brown (*American Journal of Public Health*, Oct. 1940) physicians are careless about making the blood examination required to differentiate the three species of plasmodia which call for different lines of attack.

(Continued on page xx)

**—READY APRIL 1—**

# **1941 AVMA MEMBERSHIP DIRECTORY**

Here is a complete, up to-date listing of the Association's membership—nearly 6,400 names catalogued alphabetically—combined with the following data:

- 1) Dates and places of AVMA meetings chronologically tabulated, beginning with 1863.
- 2) Directory of all presidents, secretaries and treasurers since Association's founding in 1863.
- 3) Official Roster for 1940-1941, including officers and committees; special representatives; resident state, territorial, provincial and foreign corresponding secretaries; Women's Auxiliary; House of Representatives, as of March 1, 1941; and other features.

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February 1940

April 1940

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**AMERICAN VETERINARY MEDICAL  
ASSOCIATION, 600 S. Michigan Ave.,  
Chicago**

## An' Related Topics

(Continued from page xviii)

Down in Georgia, to be exact, Lithonia, Ga., there is a factory engaged in making hen's teeth. The Davidson Granite Quarry of that city supplies a large percentage of the total grit employed in poultry production. Its owners are called "the dentists to American hens," in poultry circles. Reason: The product of the quarry is a specially hard and sharp granite that makes good grit for poultry and other birds.

### Wartime Dogs in England

The accurate registration system used in England has helped to restore hundreds of dogs to their owners after they have fled in terror from the sound of falling bombs (*Vide, Our Dumb Animals*, Feb. 1941). Obviously, the wholesale disposal of dogs in England has been exaggerated, since the report goes on to explain how dogs on the streets of London react to the noise of air raids, and that there are 240 ambulances available to go and care for injured pets at night. "Veterinary surgeons all over the country give their services free and risk their own lives to take care of these animals," the correspondent declares.

### Farmers "Independent in Nature"

In his first message to the Congress, President Lincoln wrote:

Agriculture, confessedly the largest interest of the nation, has no department or bureau, but a clerkship assigned to it in the government. While it is fortunate that this great interest is so independent in nature as to not demand or extort more from the government. I respectfully ask Congress whether something more cannot be given voluntarily with advantage.

The response to this modest recommendation was the founding of the United States Department of Agriculture, the land grant colleges and the agricultural experiment stations. *The Prairie Farmer*, America's oldest agricultural paper\* claims the credit of having initiated the movement.

\*Established January, 1841.

(Continued on page xxii)



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**An' Related Topics**

(Continued from page xx)

**Wheat Flour Low in Vitamin A**

On several occasions we have emphasized the harm that has been done to the people of this period by milling out vital ingredients wheat contains. Needless to repeat that in removing all of the germ in order to improve the keeping qualities of the flour, out went one of the elements which gave wheat its high rating in the human dietary. The white flour of the American market contains no vitamin E on account of its refinement. The result concerns human, not veterinary, medicine. Bread is of no significance in the feeding of animals.

Now comes the information that the bleached flour used in making bread contains no provitamin A, that is, its carotene content is zero, essential as that nutritional factor is now known to be. The Council on Foods and Nutrition of the American Medical Association calculated that a pound loaf of unbleached bread contains 1,000 to 2,000 U.S.P. units (0.6 to 1.2 mg.) of vitamin A, which is about one half of the daily requirement of a human adult, whereas bio-assays of bleached flour have shown this ingredient to be absent. At best, wheat is low in vitamin A. The yellow coloring material (xanthophyll) has no vitamin A value.

**Enriched Flour**

Reinforcing the nutritive value of bread by adding to flour the vitamins removed in milling is being put into practice. "Enriched flour" is going to be widely advertised, reports indicate, although the term remains to be officially approved by the Food and Drug Administration, pending a decision as to the proper title and definition of such flour.

The enriching process refers to the addition of thiamin, nicotinic acid and iron—ingredients of the wheat grain that were not removed in the stone-ground flour of former days. Later, it is said, riboflavin (vitamin B<sub>2</sub>) may be added also.

(Continued on page xxiv)

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## An' Related Topics

(Continued from page xxii)

Don't forget that the editors are always waiting for contributions that will make the JOURNAL better.

In meat inspection the quality of meat is found to correspond with the conformation and finish of the carcass . . . the fine finish of a carcass denotes proper feeding . . . to the consumer, the test of quality is the eating.—*Morse.*

Farmers buy tons of fake remedies for animal diseases and spend great sums of money for them that could be used to good advantage in subsidizing an expert veterinary service for every sick animal.

The American Chemical Society points out America's growing leadership in chemical research of organic carbon compounds, and announces that in 1939 approximately 25,000 new chemical compounds were made throughout the world, an increase of about 6 per cent over the previous year.

The government has set out to reforest a strip of land larger than the whole of Italy. The area contains 77,000,000 acres of which 74,000,000 acres are privately owned. The strip, known to the pioneers as the Great American Desert, skirts the eastern foot hills of the Rocky Mountains.

(Continued on page xxvi)

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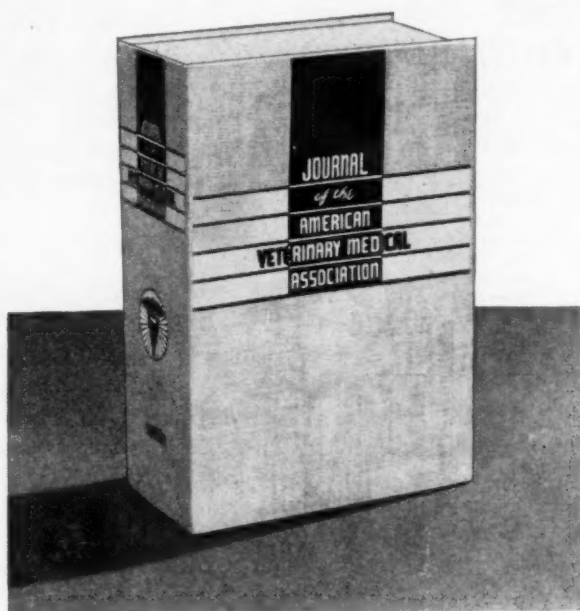


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## An' Related Topics

(Continued from page xxiv)

The sex of the opossum and other marsupials can not be determined at birth, in fact, not until they have lived three days in their mother's brood pouch.—Prof. Carl R. Moore, University of Chicago, in Science News Letter.

### The Groundhog (= Marmota Monax)

Veterinarians, being animal engineers, are not supposed to observe groundhog day, knowing that this subterranean rodent is sound asleep on the second of February. The middle of March, around St. Patrick's Day, when the hibernal slumber of Monsieur M. Monax is ending, would be the right time for this superstitious world to make its annual observation on the coming weather.

### An Old Story Worth Repeating

The salvation of the dairy farmer does not lie in the retail price of milk per quart at the home or in the price per hundred received at the farm. The hope lies more in increasing the average butterfat production per cow. The upkeep of cows producing but 140 lb. of butterfat per annum, as compared with that of cows averaging 200 to 300 lb. a year, seems to account for the milk-price controversy. To a certain extent it's the old story of the "boarder," the weak link of dairy farming.

### Post-War Sires

The Prairie Farmer reminds its readers that while the United States has become the most important reservoir for purebred livestock, we should avoid going back to the hysterical days when men traded \$10,000 rams for \$10,000 boars.

To this we would add that when the war-torn countries, with their shattered livestock, stop fighting and get back to peacetime pursuits, stockmen will discover that the number of sires required may not be numerous. Artificial insemination has been developed to a fine art.



# Logical Sequence

The report on calfhood vaccination against Bang's disease read by the chief of the United States Bureau of Animal Industry before the recent meeting of the United States Live Stock Sanitary Association placed this procedure in its proper place as the fundamental necessity for the ultimate control of Bang's disease.

It is now recognized that by a proper combination of agglutination testing and calfhood vaccination it is possible and practical to develop,

- 1st. Bang's disease free herds;
- 2nd. Herds having high resistance to infection.
- 3rd. This is accomplished without sacrificing valuable blood lines.

We wish to emphasize that indiscriminate vaccination is not recommended, and that it is now more than ever the obligation of the veterinary profession to use the greatest care in doing this work.

## Free Vaccination Certificates

Believing that they will be helpful in impressing owners with the desirability of having this work done by properly qualified veterinarians, we have prepared vaccination certificate blanks which we shall be glad to furnish free on request. These certificates provide space for proper identification of each vaccinated animal, and for both prevaccination and postvaccination agglutination reactions. These certificates should help to keep vaccination in professional

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Phenothiazine is effective against stomach and nodular worms and some species of sheep—Harwood, Vet. Med. 34 (1939) p. 440.

Phenothiazine is effective against the chicken cecal worm, Heterakis gallinae.—McCulloch and Nicholson, Vet. Med. 35 (1940) p. 398.

Phenothiazine is effective in eliminating white ascarids and nodular worms.—Swanson, Harwood and Connelly, J. A. V. M. A. 96 (1940) p. 333.

Phenothiazine is 99 per cent effective against cylicostomes and 96 per cent effective for Strongylus spp. of horses.—Habermann, Harwood and Hunt, N. A. V. 22 (1941) p. 85.



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